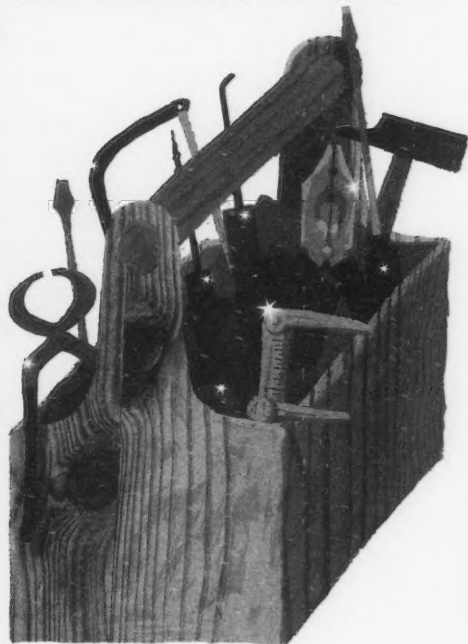


# COMPUTERWORLD

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## KNOWLEDGE CENTER DEVELOPMENT

# New Tools, New Choices

IT managers are facing big decisions about whether to use Java or Microsoft's new .Net for software development and whether to plunge into much-hyped Web services. Highlights of our special report include:

- Five factors to consider when choosing .Net or Java 2 Enterprise Edition.
- How to select the right tools for building Web services.

## SPECIAL REPORT

- Three users try to integrate legacy applications that were never meant to be integrated.

STORIES BEGIN ON PAGE 27.

### ONLINE COVERAGE

Here's a sampling of the additional features at [www.computerworld.com](http://www.computerworld.com)  
QuickLink: k1100

■ Software guru Grady Booch discusses the future of software development and Web services.

■ Can enterprise application integration and Web services coexist?

## WIRELESS LANs 'CRITICAL' FOR GM

*Automaker expects payback within a year*

BY BOB BREWIN

Viewing wireless LANs as a mission-critical infrastructure for its manufacturing operations, General Motors Corp. by year's end will have installed

them in all 25 of its North American assembly plants.

GM will initially use the massive in-plant wireless LAN infrastructure to track materials and replenish parts at stations on its assembly lines. But once the wireless LANs are in place, according to Clif Triplet, global information officer

for manufacturing and quality at GM, they can be used to support a wide range of other applications. Those include access to computer-aided design drawings and plant configuration information, which Triplet called a "virtual factory" database.

Larry Graham, global manager of manufacturing technologies for GM, said the factory wireless LAN infrastructure will bring about a "quantum change" in the ability of GM to

GM LANs, page 61

## DOD IT PROJECTS COME UNDER FIRE

*Wireless LAN security lapse at defense agency*

BY BOB BREWIN

For weeks, the agency responsible for the U.S. Department of Defense's global networks and classified command and control systems had a gaping security hole in its own front yard. Security cameras at its Arlington, Va., headquarters were connected to a nonsecure wireless LAN until last week.

Chris O'Ferrell, chief technology officer at NetSec Inc. in Herndon, Va., which provides intrusion-detection services to

LAN Security, page 14

*Navy intranet battles deployment threats*

BY DAN VERTON

Despite the recent fanfare surrounding what the U.S. Navy called a successful test and evaluation phase of its \$6.9 billion Navy/Marine Corps Intranet program, deployment problems are threatening the project, according to internal memos obtained by *Computerworld*.

In an April 25 e-mail to employees of Plano, Texas-based Electronic Data Systems Corp., the Navy's prime contractor on Navy Intranet, page 16

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#### Reports from the road: Virgin Atlantic Airways.

The Solaris Operating Environment ensures that applications for Virgin Atlantic Airways – from Web-based frequent flier information to mission-critical flight operations – are easily manageable and readily available.

#### Reports from the road: Wingcast.

Thanks to Wingcast, cars will soon be equipped with wireless safety, communication and convenience services. Anticipating millions of wired vehicles to come, Wingcast wisely chose the Solaris 8 Operating Environment for its scalability and reliability.

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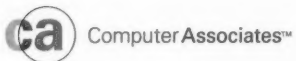
Once you get your Web services built, you're ready for the big road test: deployment. It doesn't matter how bulletproof your Web services are if they don't work all the time and they're not secure. The Solaris™ OE is a secure, reliable way to protect your Web

services investment and your hard-earned reputation for dependable service. Solaris, supporting many of the largest Internet businesses, is the foundation of Sun™ ONE and provides a rock-solid application platform for any kind of Web service.



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# COMPUTERWORLD THIS WEEK

## NEWS

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**6 Insurance and banking** firms claim that a data privacy bill in the U.S. Senate could drive up online costs and require changes to privacy compliance systems.

**6 WorldCom** announces a nationwide data networking service that supports the use of Ethernet over metro- and wide-area networks.

**7 IBM details** planned additions to its DB2 databases at a North American user group conference, but some users have their own wish lists for the software.

**8 Sun's StarOffice** desktop application sells for a lot less than Microsoft's Office XP, but it's unclear whether that will persuade Office users to jump ship.

**10 The planned acquisition** of Lands' End by Sears poses new IT challenges for the catalog and online retailer. Plus, a Q&A with Sears CIO Jerry Miller.

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## ONLINE

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On some pages in this issue, you'll see a QuickLink code pointing to additional, related content on our Web site. Just enter that code into our QuickLink box online, which you'll see at the top of each page on our site.

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## KNOWLEDGE CENTER DEVELOPMENT

### SPECIAL REPORT

### 27 New Tools, New Choices

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developing your own Java applications. But if you want to build apps that will make end users truly happy, spending more now will help you avoid grief from end users later, says columnist Kevin Fogarty.

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Security for Web services is a major hurdle, but some companies are deploying Web services anyway — after evaluating the risks and benefits.

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**44 Extreme Integration** Follow the trail of three users as they attempt to integrate their legacy systems.

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**ONLINE:** Why classroom training in Java development doesn't impress some employers. QuickLink: 29401

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### APP DEVELOPMENT CASE STUDIES

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### THE FUTURE OF SOFTWARE DEVELOPMENT

Q&A: Software guru Grady Booch discusses modeling, complexity, the future of software development and the flaws in Web services. QuickLink: 29748

### THE CHANGING FACE OF APP INTEGRATION

Web services may eventually wipe out traditional application integration, but for the next few years, integration technology will evolve alongside Web services. QuickLink: 29755

## AT DEADLINE

### Microsoft Stands by New Patch for IE

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BY PATRICK THIBODEAU  
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*Provides alternative to frame relay, ATM*

BY MICHAEL MEEHAN

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\*\*The Hollings bill requires companies to permit consumers to see personal data but lets them charge up to \$3 for access.

people see what they are supposed to see and nothing else," he said.

Richard Stiennon, an analyst at Gartner Inc. in Stamford, Conn., and a former auditor, said IT sometimes overlook test environments in data protection, but auditors usually look for security vulnerabilities there. "That's where the richest ground was found," he said. ▀

ogy from Brampton, Ontario-based Nortel Networks Ltd.

Clint Fast, network administrator at Allied Building Products Corp. in East Rutherford, N.J., said he plans to use a similar metro-area Ethernet convergence service by MegaPath Networks Inc. in Pleasanton, Calif. Currently, Allied runs its network on 75 separate Digital Subscriber Line connections. Linking those as part of a single Ethernet-based VPN will let the company proceed with voice over IP and supply chain projects that require a more robust communications backbone, Fast said. ▀

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## DB2 Plans Prompt Enthusiasm, Wish Lists

*Self-managing capabilities, improved 64-bit mainframe support in the works*

BY MARC L. SONGINI  
SAN DIEGO

IBM last week detailed a series of upcoming enhancements to its DB2 databases at the annual North American conference of the software's user group. Users at the conference showed enthusiasm about some of the planned new features, but sev-

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The promised capabilities include new "smart database" self-managing tools and the ability for the flagship DB2 Universal Database software to take better advantage of IBM's 64-bit mainframe technology.

Some of those features are due to become available later this year, IBM said (see chart).

Robert Catterall, director of strategic technology for the e-commerce division at DB2 user CheckFree Corp. in Norcross, Ga., said he especially likes the sound of some of the 64-bit architecture features that IBM has in the works for the mainframe version of the database. For example, memory efficiencies will hopefully reduce the amount of CPU cycles that

DB2 needs to use, he said.

The self-managing features would also be helpful, Catterall added. "We're trying to grow the [data] workload without growing the personnel at the same rate," he said.

But Catterall said the Unix and Windows versions of DB2 are "somewhat more feature-rich" than the mainframe one. The gap was reduced by Versions 6 and 7 of DB2 for OS/390 and z/OS, he said. But, he added, "I'd like to see it close further, preferably to the point of being eliminated."

That would make it easier to do cross-platform development for DB2, said Catterall. CheckFree, which sells e-business software and services, is also installing DB2 for Unix and wants its developers to be able to use the same tools across the board, he said.

Kathy Komer, president of the Chicago-based International DB2 Users Group, said she wants to see more complete integration between DB2 and related products, such as IBM's WebSphere application server. IBM has made some progress in that area, said Komer, who works as a database architect at insurer Aetna Inc. in Hartford, Conn. But, she added, "we don't believe they're done yet."

Jeff Jones, director of strategy for IBM's data management solutions, said the company is

needed in the final remedy.

But the memo is in procedural limbo. Judge Colleen Kollar-Kotelly is clearly aware of it but hasn't officially admitted it into the record. She has been very cautious about what does get entered. "This judge is a stickler for procedure," said Bob Lande, an antitrust professor at the University of Baltimore Law School.

Throughout the trial, Kollar-Kotelly has consistently ruled in favor of Microsoft on many procedural motions.

But in court last week, she was a changed person. For the first time, she challenged both sides on a range of legal issues in an effort to sort out legal positions. Her questions seemed evenhanded.

In particular, she zeroed in on the key issue of the case of whether the Court of Appeals' decision finding that Microsoft had illegally maintained its monopoly opened the door for the range of remedies affecting handhelds, set-top boxes, server operating systems and Web services.

Kollar-Kotelly wouldn't tip her hand but isn't ruling out the possibility of a broader remedy and discussed in court whether these other technologies "are now in need of protection." Both sides argued their points before the only person who can answer that question. ▀

## Microsoft Trial Remedy Phase Closes With Dramatic E-Mail

*Suggests retaliation against PC makers supporting Linux*

BY PATRICK THIBODEAU  
WASHINGTON

Just three months after Microsoft trial Judge Thomas Penfield Jackson ruled that Microsoft Corp. "placed an oppressive thumb on the scale of competitive fortune," a top Microsoft executive sent a memo to Bill Gates and other officials recommending "underground" retaliatory actions against PC makers developing Linux-compatible devices.

In the August 2000 memo, Joachim Kempin, who headed original equipment maker relations for Microsoft at the time, complained that Intel Corp. was encouraging employees at large PC makers to support Linux and fund devices that would work well with the operating system.

Kempin said that to "play this the hard way" would "get more attention than we need." Instead, he concluded that Microsoft should "work underground with the clear understanding to promote and advantage guys with less market

share without declaring that to be our strategy. I would further try to restrict source-code deliveries where possible and be less gracious when interpreting agreements — again without being obvious about it."

A Microsoft spokesman dismissed the memo as "random thoughts" that were never acted upon. Also, in a deposition, CEO Steve Ballmer characterized the memo's author as "prone to hyperbole."

### Memo in Limbo

The memorandum was probably the most dramatic piece of e-mail evidence the nine nonsettling states produced in the remedy phase, and they had planned to use it to strengthen their legal arguments that stronger anti-retaliatory provisions are

### CASE HISTORY

For complete Computerworld coverage of the Microsoft antitrust trial, visit:

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### What's Next

**CLOSING ARGUMENTS:** Both sides won't return to court until June 19 for closing arguments.

**DECISION:** Late summer or early fall.

## On the Way

### DUE OUT LATER THIS YEAR:

■ Support within mainframe DB2 for more fully exploiting IBM's 64-bit zSeries systems

■ Additional self-managing and system resource tuning capabilities

### OTHER ENHANCEMENTS IN THE WORKS:

■ Continued efforts to tighten integration with other IBM products, such as WebSphere

■ The ability to reorganize data without having to take a database down

■ Support for developing Microsoft .Net apps on DB2 for Windows

working to close the functionality gap between different DB2 releases. It already supports the ability to create repeatable processes that let users transfer SQL commands from one version of the database to another, he said.

In addition, an IBM spokeswoman said the next release of DB2 for OS/390 and z/OS will include a tool that can automatically summarize information, such as monthly sales totals. The feature is already included in DB2 for Unix and Windows.

IBM is also focused on more completely integrating its different software products with one another, including DB2, the spokeswoman added. ▀

## IBM Works on Marketing Challenges

IBM took over the top spot in the overall database market last year, according to sales data released this month by Stamford, Conn.-based Gartner Inc. But attendees at the DB2 conference said IBM has to work harder on marketing if it wants to make more inroads with Unix and Windows users.

"They still have work to do in building mind share in the Unix [database] market," said Robert Catterall, director of strategic technology for the e-commerce division at CheckFree.

Database users tend to be conservative and generally stick with what they have, noted James Governor, an analyst at Nashua, N.H.-based Illuminata Inc. IBM has increased its mar-

keting efforts for the Unix and Windows versions of DB2, Governor said. But he added that the database still hasn't penetrated Oracle Corp.'s installed base of users as quickly as IBM officials would like.

Kathy Komer, president of the International DB2 Users Group, said IBM in the past was more comfortable dealing with the largest companies. But it's learning how to sell to a wider range of users, she added.

An IBM spokeswoman said the company is working to address the awareness issue in the Unix and Windows markets through a new marketing campaign designed to highlight those versions of DB2. — Marc L. Songini



## AT DEADLINE

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DB2 needs to use, he said.

The self-managing features would also be helpful, Catterall added. "We're trying to grow the [data] workload without growing the personnel at the same rate," he said.

But Catterall said the Unix and Windows versions of DB2 are "somewhat more feature-rich" than the mainframe one. The gap was reduced by Versions 6 and 7 of DB2 for OS/390 and z/OS, he said. But, he added, "I'd like to see it close further, preferably to the point of being eliminated."

That would make it easier to do cross-platform development for DB2, said Catterall. CheckFree, which sells e-business software and services, is also installing DB2 for Unix and wants its developers to be able to use the same tools across the board, he said.

Kathy Komer, president of the Chicago-based International DB2 Users Group, said she wants to see more complete integration between DB2 and related products, such as IBM's WebSphere application server. IBM has made some progress in that area, said Komer, who works as a database architect at insurer Aetna Inc. in Hartford, Conn. But, she added, "we don't believe they're done yet."

Jeff Jones, director of strategy for IBM's data management solutions, said the company is

needed in the final remedy.

But the memo is in procedural limbo. Judge Colleen Kollar-Kotelly is clearly aware of it but hasn't officially admitted it into the record. She has been very cautious about what does get entered. "This judge is a stickler for procedure," said Bob Lande, an antitrust professor at the University of Baltimore Law School.

Throughout the trial, Kollar-Kotelly has consistently ruled in favor of Microsoft on many procedural motions.

But in court last week, she was a changed person. For the first time, she challenged both sides on a range of legal issues in an effort to sort out legal positions. Her questions seemed evenhanded.

In particular, she zeroed in on the key issue of the case of whether the Court of Appeals' decision finding that Microsoft had illegally maintained its monopoly opened the door for the range of remedies affecting handhelds, set-top boxes, server operating systems and Web services.

Kollar-Kotelly wouldn't tip her hand but isn't ruling out the possibility of a broader remedy and discussed in court whether these other technologies "are now in need of protection." Both sides argued their points before the only person who can answer that question. ▀

## Microsoft Trial Remedy Phase Closes With Dramatic E-Mail

*Suggests retaliation against PC makers supporting Linux*

BY PATRICK THIBODEAU  
WASHINGTON

Just three months after Microsoft trial Judge Thomas Penfield Jackson ruled that Microsoft Corp. "placed an oppressive thumb on the scale of competitive fortune," a top Microsoft executive sent a memo to Bill Gates and other officials recommending "underground" retaliatory actions against PC makers developing Linux-compatible devices.

In the August 2000 memo, Joachim Kempin, who headed original equipment maker relations for Microsoft at the time, complained that Intel Corp. was encouraging employees at large PC makers to support Linux and fund devices that would work well with the operating system.

Kempin said that to "play this the hard way" would "get more attention than we need." Instead, he concluded that Microsoft should "work underground with the clear understanding to promote and advantage guys with less market

share without declaring that to be our strategy. I would further try to restrict source-code deliveries where possible and be less gracious when interpreting agreements — again without being obvious about it."

A Microsoft spokesman dismissed the memo as "random thoughts" that were never acted upon. Also, in a deposition, CEO Steve Ballmer characterized the memo's author as "prone to hyperbole."

### Memo in Limbo

The memorandum was probably the most dramatic piece of e-mail evidence the nine nonsettling states produced in the remedy phase, and they had planned to use it to strengthen their legal arguments that stronger anti-retaliatory provisions are

### CASE HISTORY

For complete Computerworld coverage of the Microsoft antitrust trial, visit:

QuickLink: s1100  
www.computerworld.com

### What's Next

**CLOSING ARGUMENTS:** Both sides won't return to court until June 19 for closing arguments.

**DECISION:** Late summer or early fall.

## On the Way

### DUE OUT LATER THIS YEAR:

■ Support within mainframe DB2 for more fully exploiting IBM's 64-bit zSeries systems

■ Additional self-managing and system resource tuning capabilities

### OTHER ENHANCEMENTS IN THE WORKS:

■ Continued efforts to tighten integration with other IBM products, such as WebSphere

■ The ability to reorganize data without having to take a database down

■ Support for developing Microsoft .Net apps on DB2 for Windows

working to close the functionality gap between different DB2 releases. It already supports the ability to create repeatable processes that let users transfer SQL commands from one version of the database to another, he said.

In addition, an IBM spokeswoman said the next release of DB2 for OS/390 and z/OS will include a tool that can automatically summarize information, such as monthly sales totals. The feature is already included in DB2 for Unix and Windows.

IBM is also focused on more completely integrating its different software products with one another, including DB2, the spokeswoman added. ▀

## IBM Works on Marketing Challenges

IBM took over the top spot in the overall database market last year, according to sales data released this month by Stamford, Conn.-based Gartner Inc. But attendees at the DB2 conference said IBM has to work harder on marketing if it wants to make more inroads with Unix and Windows users.

"They still have work to do in building mind share in the Unix [database] market," said Robert Catterall, director of strategic technology for the e-commerce division at CheckFree.

Database users tend to be conservative and generally stick with what they have, noted James Governor, an analyst at Nashua, N.H.-based Illuminata Inc. IBM has increased its mar-

keting efforts for the Unix and Windows versions of DB2, Governor said. But he added that the database still hasn't penetrated Oracle Corp.'s installed base of users as quickly as IBM officials would like.

Kathy Komer, president of the International DB2 Users Group, said IBM in the past was more comfortable dealing with the largest companies. But it's learning how to sell to a wider range of users, she added.

An IBM spokeswoman said the company is working to address the awareness issue in the Unix and Windows markets through a new marketing campaign designed to highlight those versions of DB2. — Marc L. Songini

# T+1 Compliance May Need Kick-Start From Regulators

*Meeting 2005 next-day trade processing goal could cost industry \$8 billion*

BY LUCAS MEARIAN

**T**HE FINANCIAL services industry will spend \$8 billion over the next four years — or \$2 billion to \$4 billion more than it collectively spent on the Y2k problem — in order to clear trades in a single day (T+1) vs. the current three-day cycle, according to the Securities Industry Association (SIA).

At the SIA's annual operations conference in Palm Desert, Calif., earlier this month, some bankers and brokers said that while they don't expect their firms to be T+1 ready until 2005, many question the business case for moving to straight-through processing (STP) of trades.

The challenges involved in preparing for T+1 and STP are

spurring some organizations to consider spending money now to upgrade computer systems and integrate databases and back- and front-end systems.

One company that's moving ahead on the T+1 front is A.G. Edwards & Sons Inc. in St. Louis, which is planning to change out all of its core processing systems. According to Gregory Vitt, who works in the firm's information processing unit, the company is currently evaluating a group of vendors to outsource its processing systems to. The firm currently handles processing in-house.

"The cost [to move to STP or real-time processing] is going to be big," said Vitt, who was unable to quantify the investment needed but estimated that the project would take two years to complete.

Still, IT managers will be hard-pressed early in their T+1 initiatives to squeeze money from senior management to upgrade systems and install middleware to achieve STP because the return on investment won't be immediately apparent, said SIA Executive Vice President Donald Kittell.

In order to get brokerages moving on T+1 initiatives, the industry either needs a mandate, such as an SIA member vote, or compliance deadlines from regulators such as the Securities and Exchange Commission, said Kittell. "We need urgency," he added.

Chris Sandel, vice president of execution and clearance services at New York-based Fleet Securities Inc.'s U.S. clearing division, agreed that SEC intervention will be needed.

"Back ends and front ends are out of sync. This will definitely cause another round of consolidations in this industry, because not everyone will be

able to afford it," Sandel said.

Another issue confronting financial services firms in moving to STP or T+1 is the changeover to a new standard electronic messaging format dictated by the Society of Worldwide Interbank Financial Telecommunications (SWIFT), which has set a Nov. 16 deadline for the shift.

SWIFT is a Belgium-based international banking cooperative that created a messaging service used by more than 7,000 financial institutions for overnight payment clearance.

## Achieving Efficiencies

T+1 and STP will require systems automation to achieve the speeds needed to clear trades in a single day or on the same day. A standard messaging format would allow front-end and back-end systems to communicate efficiently.

Banks and brokerages currently use a proprietary messaging format, the current


SWIFT message format or a combination of both. The result: Data inputting isn't consistent, according to Francis Ramacle, head of SWIFT's securities industry division.

Ramacle said he expects most of the Global 1,000 brokerages and custodial banks to be in compliance by the November deadline, but he and others are concerned that many smaller firms will be using old formats.

In order to move toward STP, Deutsche Bank AG is developing an application in conjunction with Antwerp, Belgium-based Capco, a financial services consulting firm, that will convert brokers' trade messages into SWIFT's new format. Those trade messages can then be processed by Deutsche Bank's back-end systems and clearinghouses, according to Genevieve Dimitron, vice president of product development at the Frankfurt-based bank. ■

## MESSAGING MUDDLE

To learn about how a few banks and brokerages have complied with SWIFT's messaging format, visit our Web site.

 QuickLink: 29667  
[www.computerworld.com](http://www.computerworld.com)

# StarOffice 6.0 Opens Sun's Price Contest With Microsoft

*Savings aimed at luring customers from Office XP*

BY TODD R. WEISS

The price gap between Microsoft Office XP and Sun StarOffice 6.0 is substantial, but is it enough of a motivator for users to jump ship to StarOffice?

Sun Microsystems Inc. is betting that the savings will lead some companies to move away from Office XP toward StarOffice 6.0 in their search for comparable features at lower costs. Microsoft Corp. discounts such theories, arguing that users won't want less functionality because it would ultimately reduce worker pro-

ductivity and cost more money overall.

Based on price alone, the savings are impressive. StarOffice 6.0 retails for \$76 per copy, and each copy can be used on up to five PCs. Microsoft Office XP Standard, which has application features comparable to StarOffice, retails for \$479, and each copy can be used on only one PC.

Microsoft's volume licensing program can cut the cost of the XP Standard version to \$297 to \$377 per copy, according to Stamford, Conn.-based research firm Gartner Inc. StarOffice 6.0 prices drop to \$50 per copy for 150 or more copies and to \$25 each for more than 10,000 copies.

The savings are important to Eric Lesatz, vice president of information systems at A.B.

Watley Group Inc. The New York-based financial services firm has rolled out StarOffice 6.0 to 25 of its 75 users and has replaced Microsoft Office 97 on about 10 machines. Workers see no appreciable differences when using the suites, according to Lesatz.

But the cost gap is a huge factor, he said, and will likely mean that Microsoft's suite will be available only to users at his company who absolutely require it. "For 98% of the people [here at A.B. Watley], I would say [StarOffice is] going to do the job," he said.

## Compatibility vs. Savings

Although the savings would be nice, Jon Dell'Antonia, vice president of MIS at clothing maker OshKosh B'Gosh Inc. in Oshkosh, Wis., said he wouldn't

switch over because Microsoft Office products are what his customers and vendors are using. File compatibility with other products would be a concern, he said, and avoiding the potential problems is worth the added cost of staying with

## Price Comparison

### StarOffice 6.0

- \$76 retail
- 150 to 10,000 copies, \$50 each
- More than 10,000 copies, \$25 each

### Microsoft Office XP Standard

- \$479 retail

### Microsoft Office XP volume licensing

- \$297-\$377 per copy

Microsoft Office.

"We've already signed the licensing agreement to do it because we know the handwriting is on the wall," Dell'Antonia said.

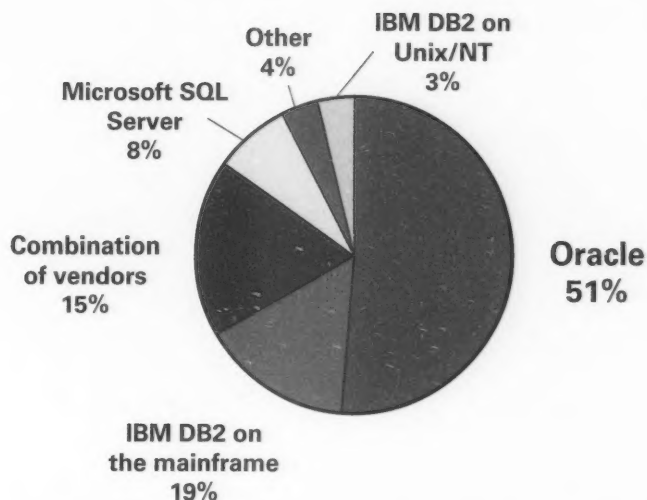
Analyst Gordon Haff at Illuminata Inc. in Nashua, N.H., said StarOffice has a chance of taking on Office XP because of anger from customers who are tired of paying high licensing fees. "Microsoft seems determined to see how much money it can squeeze out of buyers, but in doing so, they're opening up an opportunity for somebody else to come in," Haff said.

Microsoft spokeswoman Nicole von Kaenel said users will continue to see a huge difference in value between the Microsoft and Sun suites, despite the price gaps.

"There's a huge distinction between value and price," she said. ■

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Source: The FactPoint Group, April 2002

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## BRIEFS

## CA Board Sets New Operating Policies

Computer Associates International Inc. said its board adopted a new set of operating policies and procedures that included naming a lead independent director and establishing guidelines for doing annual reviews of the software vendor's CEO. The normal size of Islandia, N.Y.-based CA's board was set at 12 directors, with only three of them from inside the company.

## IBM CEO Palmisano Mum on Possible Cuts

Samuel Palmisano, IBM's new CEO, said during a meeting with financial analysts that the company is taking action to stem losses at its PC and disk drive units. But he didn't directly address questions about reports that IBM is preparing to lay off up to 3% of its 320,000 employees [QuickLink: 29690]. "You'll hear more about what we're doing [to reduce costs]," Palmisano said.

## Dell Q1 Results Similar To Year-Earlier Figures

Dell Computer Corp. reported net income of \$457 million for its first quarter ended May 3, down 1% from the year-earlier level of \$462 million. Revenue was up slightly at \$8.07 billion, compared with \$8.03 billion in last year's first quarter. The results were above Dell's earlier projections, and the company said second-quarter revenue could increase by up to 8% year over year.

## Short Takes

New York-based COLGATE-PALMOLIVE CO., which has used SUN MICROSYSTEMS INC.'s servers, said it's standardizing its systems on IBM hardware. . . . A U.S. District Court judge denied a request by MICROSOFT CORP. to reconsider a ruling that let San Diego-based LINDOWS.COM INC. sell an operating system under the name Lindows.

## Sears, Lands' End Prep For Tech Challenges

*Systems need little integration, but analysts predict more work in the future*

BY CAROL SLIVA

WELL KNOWN for its catalog and online operations, Lands' End Inc. will now learn the fine points of making sure its fleeced-lined jackets, turtlenecks and other apparel lines are well stocked in 870 retail stores throughout the U.S.

When Sears, Roebuck and Co. last week announced its intention to buy the Dodgeville, Wis.-based retailer for \$1.9 billion, Lands' End not only gained access to a nationwide chain of stores. It also garnered new chances for systems integration and different sorts of IT challenges associated with planning and distributing crates of inventory to retail stores, rather than picking, packing and shipping items for individual customers.

Sears CIO Jerry Miller said a team from both companies, including IT personnel, will look for opportunities to integrate systems, share best practices and create links to each other's Web sites. But since Lands' End will operate separately as a wholly owned subsidiary, Hoffman Estates, Ill.-based Sears will deal with its new acquisition in much the same way it deals with other vendors, minimizing the need for extensive systems integration work, Miller said.

"It makes it very easy, very simple and very quick," he said.

But some analysts predicted that the two retailers eventually will want to do more systems integration work to make sure the merger goes well. Geri Spieler, an analyst at Stamford, Conn.-based Gartner Inc., said they will need to integrate in-

ventory, replenishment, forecasting and merchandising systems to maintain Lands' End's good reputation.

"There's a higher expectation of performance," she said, adding that Sears won't be able to deal with Lands' End in the same way it deals with other suppliers.

James Dion, president of Dionco Inc., a Chicago retail consultancy, said the retailers will want to make sure they're carrying the right amount of inventory and predicting demand properly, potentially necessitating some heavy integration work.

"If Lands' End orders too much and Sears can't take it, what does Lands' End do with it?" Dion said. "They are going to have their catalog and Web operation, but there is no other kind of safety valve than the ordinary arm's-length

AT A GLANCE  
Teamwork

An integration team from Sears and Lands' End will look for opportunities to integrate systems and share best practices.

■ Both retailers have a mixture of home-grown and packaged systems.

■ Both use the same Mobius reporting system.

■ Lands' End will take responsibility for Sears' Web site and catalog operations.

vendor would have."

To anticipate Sears' needs, Lands' End will want to get access to point-of-sale information to spot sales trends and better prepare for resupplying goods, he said.

"Buying in retail is very different than buying for catalog," said Dion, who formerly worked in buying at Sears.

Gartner analyst Adam Sarnier said Sears and Lands' End will want to find ways to share customer data between their online and in-store channels in order to spot their most prof-

itable customers and do better supply chain planning.

Chris Merritt, an analyst at Atlanta-based Kurt Salmon Associates, a retail consultancy that has worked with both Sears and Lands' End, said there could be a "real business risk" associated with Sears trying to absorb Lands' End.

But Merritt said he expects Sears' Web site and catalog operations to eventually wind up on Lands' End innovative infrastructure. Already, the retailers have announced that Lands' End CEO David Dyer will assume responsibility for Sears' existing customer-direct business, which includes its Web site.

Merritt said the biggest IT hurdle associated with the merger will lie in Lands' End's ability to direct its inventory to Sears' stores.

"Lands' End is a world-class operation," Merritt said. "They have the core infrastructure in place. It's just a lot of work to add a retail product flow to the current infrastructure."

Plans call for Lands' End apparel to be available at some Sears stores this fall, with the full rollout by fall 2003.

"We can really help each other, and we can get this up and running very quickly," said Miller. "It's not quite as complicated as one might think."

## Sears CIO: IT Departments to Remain Separate

Jerry Miller, CIO at Sears, last week discussed the IT implications of his company's purchase of Lands' End with Computerworld senior editor Carol Sliva. Interview excerpts follow:

**Will Sears and Lands' End IT departments fuse?**  
We're going to operate this as a wholly owned subsidiary. So they're going to have their IT department.



**MILLER:** "This is not a cost-reduction acquisition."

**Will you connect electronic data interchange systems?**  
Yes.

**Will the IT staff at Lands' End be responsible for running the systems needed to distribute merchandise to your stores?** Where we can help, we will. That primarily will be a Lands' End challenge, and they've got the management team to handle that.

**From an IT perspective, what are the greatest challenges that your two companies face going forward?** Primarily to identify where there are opportunities to integrate and to leverage, to make sure that we

make the right decisions.

I think we need to be careful here. We don't need to rush to judgment. . . . We didn't purchase them to try to get some synergy of scale. This is not a cost-reduction acquisition.

**Will IT people be assigned to find potential areas of synergy?** Oh yeah. We're going to have an integration team made up of Lands' End people as well as Sears people, and we will look for areas of opportunity to integrate and share best practices. But the last thing we want to do is upset the apple cart here.

## MORE FROM MILLER

Read the complete text of this interview with Sears' CIO at our Web site:

QuickLink: 29902  
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# Business Continuity Plans Embrace Networks, People

*Companies shore up disaster recovery in response to business needs, terror threat*

BY JAIKUMAR VIJAYAN  
CHICAGO

**C**OMPANIES ARE broadening their business continuity plans in response to business trends and to the events of Sept. 11, said analysts at a Gartner Inc. information security conference last week.

On the business front, the trend toward zero-latency networks, through which corporations can access and act on real-time business data, presents new risks to companies from a business continuity and disaster recovery standpoint.

The risks include those posed by insecure external service providers, data links to third parties, software vulnerabilities and human error.

Problems in any of these areas could seriously disrupt a network that needs to be on all the time and therefore have to be factored into disaster recovery and business continuity plans, said Roberta Witty, an analyst at Stamford, Conn.-based Gartner.

## Know Thyself

Companies must understand their external links, the consequences of failure of any of these links and the contingencies to deal with such failures. In terms of architecture, it might mean looking at what kind of load-balancing and high-availability technologies are in place at a corporation, Witty said.

"This is not just about having [an application] that you bring up in recovery mode.... You are talking about having a production environment up and running all the time, whether it is in one location or more," she said.

Meanwhile, formerly asset-

centric business continuity plans are broadening to include people, processes and work spaces, especially after Sept. 11, Witty added. New planning scenarios include loss of life, key decision-makers and communications capabilities, she said.

For instance, Aetna Inc. in Hartford, Conn., has broadened the scope of its disaster planning since Sept. 11 to include people and processes, said Kurt Bahrs, a disaster recovery specialist at Aetna.

Although the insurance company has two data centers in the Hartford area, it centralized most operations in one of the facilities about five years ago. Now Aetna is again dispersing staff between the facilities as a business continuity measure.

On the technology front, Aetna has already taken steps to ensure business continuity. All third parties linking into the company's Hartford network, for instance, must have fully redundant connections. In some cases, the Hartford network provides the redundancy at cost to the third party to ensure disaster tolerance, said Bahrs.

New York-based Cadwalader, Wickersham & Taft, whose offices had to be evacuated following the Sept. 11 attacks, has also expanded its disaster plans.

The law firm recently installed a laser-based communicator for replicating data between two of its facilities. Now instead of having to restart tape backups at a service provider location, the company is able to do so much more quickly from its own facility.

"It took us about a day to recover [from tape]. That's not good enough any longer," said Greta Ostrovitz, director of IT at the firm.

Cadwalader, Wickersham &

## Tech Consortium Created to Improve Software Reliability

*\$30M intended to spark debate, help develop standards*

BY DAN VERTON  
WASHINGTON

A group of 18 organizations from all sectors of the economy has teamed with Carnegie Mellon University in Pittsburgh to form a technology consortium dedicated to improving the reliability and security of commercial software.

Armed with \$30 million in seed money from grants from private institutions, the new Sustainable Computing Consortium (SCC) will work to initiate public policy debates and create new standards and techniques for developing more reliable software.

In addition to the university, SCC founders include Microsoft Corp., Oracle Corp., American International Group Inc. (AIG), Cisco Systems Inc., Mel-

lon Financial Corp. and NASA.

"Software systems have become the critical infrastructure of our nation and economy. Unreliable software has profound consequences," said William Guttman, director of the Pittsburgh-based SCC. He added that the loss of a single cellular telephone network node due to a software failure could cost a company \$18,000 or more per minute.

In fact, statistics recently released by the Washington-based National Research Council show that U.S. companies spent \$175 billion last year to repair damages caused by software defects and \$12.3 billion to repair systems affected by computer viruses. SCC officials said those costs are likely to rise this year.

## Taking Action

However, the software industry is still in its infancy when it comes to taking action on reliability and security issues, said Jim Morris, dean of

the school of computer science at Carnegie Mellon.

Steve Perkins, senior vice president of Oracle's public-sector and homeland security division, agreed. "Software, as an industry, is pretty immature," Perkins said. "We lack the metrics, the standards and the discipline, [and] these kinds of capabilities cannot be architected [into software] after the fact."

"We now have all of the players who can address these problems," said Morris. He added that the SCC will be ac-

## Recovery Advice

*What to focus on when business continuity plans are limited.*

**CRISIS MANAGEMENT PLAN** for ensuring safety of employees, continuity of decision-making and view from outside world

**ASSET LIST** and key supplier contact information

**SECURE**, off-site backup storage

**SPENDING** on most critical business processes

**WORK-AT-HOME PROGRAMS** for work space recovery

Taft is also looking at building similar disaster tolerance into other aspects of its business, she said. For example, the company has direct electronic links with several of its clients around which it plans to build greater redundancy. ■

tively recruiting other companies to take part.

However, questions were raised during a press briefing regarding the incentives that exist for software vendors to improve the reliability and security of their systems. Many companies, such as Oracle, use the unique security features of their software as selling points and marketing tools against competitors.

Ty Sagalow, chief operating officer at New York-based AIG's eBusiness Risk Solutions group, one of the largest U.S. insurance companies that offers security risk insurance, said the insurance industry will play an important role in promoting "positive behaviors" in software developers.

However, Sagalow added, the SCC will be key in helping the industry quantify cyber-risks. "We must act now," he said. "There is a business need to create a cycle of risk management."

Guttman said the consortium hopes to define specific challenges and a plan for developing technological measurements within the next year. He declined to elaborate on specific deliverables and timetables. ■

## Reliable Path

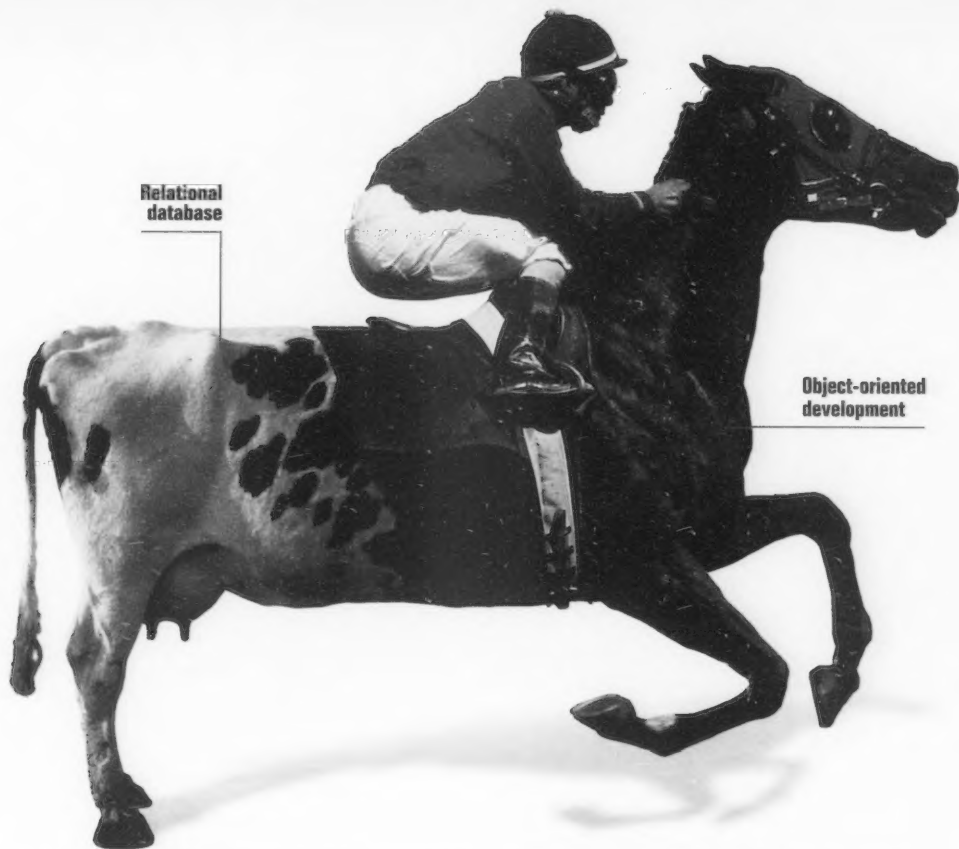
*The charter for the SCC says it must do the following:*

**FOSTER** the development of standards to reduce software defects.

**QUANTIFY** and reduce the risks that software poses to critical infrastructures.

**RALLY** businesses, developers, and public policy decision-makers to tackle the technical, legal and legislative issues surrounding reliable software.

**CONDUCT** independent research and measurement, and develop best practices for software quality and dependability.



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## Cisco Makes Its Routing Software More Resilient

BY MICHAEL MEEHAN

A week after Cisco Systems Inc. CEO John Chambers trumpeted the importance of network resiliency at the Network-Interop conference, the company announced a major upgrade of its routing software that's aimed at reducing the number of network failures.

Cisco said the network resiliency features that are being built into the new release of its Internetwork Operating System (IOS) software include protections to guard against

the loss of any data packets, the ability to circumvent failed devices and faster rerouting sequences when network problems occur.

"It's a definite step forward in terms of resiliency," said Joe Fusco, product manager for private IP network services at Infonet Services Corp., a Cisco user in El Segundo, Calif. "Right now, it's a matter of making sure we feel it's ready for deployment, but the new features certainly interest us."

Fusco said he's particularly

intrigued by the zero packet loss features. "If you can get from 99.3% throughput levels to 100%, that's a lot of packets," he said. "We move millions of packets a day."

Tim Smith, an analyst at Gartner Inc. in Stamford, Conn., said the Cisco IOS release "represents another step in the maturation" of IP. Surer handling of data packets and consistent uptime are critical for moving voice, video and storage data across corporate networks, he said.

At the N+I conference in Las Vegas, Mike Volpi, a senior vice president in Cisco's enterprise group, asserted that a more resilient backbone would allow IP-based networks to handle increased traffic as well

as more complex kinds of data.

For example, Volpi said storage installations are "an absolute shoo-in" to run on IP if the networking technology can be made as robust and reliable as Cisco thinks.

Cisco's IOS software can also work with hardware from other vendors. However, "the most benefit from these capabilities will still be felt when it's all Cisco working on the back end," Smith said. "There's some standardization that needs to happen to make this a better fit for enterprises with heterogeneous networks."

The first wave of resiliency features will become available next month, Cisco said. In the second half of the year, the company plans to add a proto-

col that lets users operate a standby wide-area network connection even when the primary link is in use, plus the ability to rebuild encrypted virtual private network tunnels when a primary router fails.

Smith said demand for such services is high, leaving Cisco with little leeway for error. "There is absolutely no room in the market for missed dates [or] for rolling out stuff that's not rock-solid," he said.

Fusco noted that early adopters, such as Infonet, will likely spend a few months testing how resilient the new features are before they put them into use. "This is new stuff, and we want to see how resilient it really is before we put too much trust in it," he said. ■

Continued from page 1

## LAN Security

numerous federal agencies and commercial customers, detected the nonsecure wireless LAN at the Defense Information Systems Agency (DISA) on May 10.

While parked across the street from DISA's headquarters, O'Ferrell was able to view the Service Set Identifier (SSID) numbers of access points and numerous IP addresses. Using a standard 802.11b wireless LAN card attached to his laptop computer and AP detection software from San Diego-based Net-Stumbler.com, he was able to scan the network in less than half an hour.

### Lackadaisical Safeguards

O'Ferrell, who didn't attempt to enter the network, also determined that DISA had failed to protect the system with the most basic form of 802.11b security, the Wired Equivalent Privacy (WEP) protocol.

The lack of encryption and other protections could make it possible for an intruder to enter the security camera system by launching a denial-of-service attack against a specific access point, allowing the in-

truder to "spoof" that access point. That would enable him to view what security personnel see with the closed-circuit TV camera.

The wireless LAN allows security personnel to remotely pan, tilt or zoom the cameras, according to Betsy Flood, a DISA spokeswoman.

That information could make it easier for intruders to conduct a physical penetration of the compound, which houses the Defense Department's Global Network Operations Center, Computer Emergency

Response Team and Network Security Operations Center.

O'Ferrell expressed concern that DISA had taken what he considered to be a casual approach to wireless networks operating at its headquarters.

Flood confirmed that DISA had operated a closed-circuit TV security camera system for about 45 days without encryption while it was being tested. During that time, she said, anyone sniffing the nonencrypted system could indeed "see what we see on our video monitors, i.e., the parking lot, the front

gate, the fence line, etc."

Flood, who said on May 16 that the agency planned to encrypt the network by the end of that day, also acknowledged that one of the cameras was broadcasting the "AP-BLDG 12" SSID, an access point SSID for one of the cameras in the compound. She said DISA is working with its vendors to change settings to make the system more secure.

Flood said DISA's closed-circuit TV wireless LAN would be encrypted with 64-bit WEP and a trademarked 128-bit encryption algorithm from Bedford, Mass.-based RSA Security Inc. called RC4. She added that it would also be protected by a control table for Media Access Control addresses, the unique identifier for each computer on a network.

Flood emphasized that the wireless LAN security camera system was separate from other DISA networks.

O'Ferrell said the SSID of the access point he detected had an obvious name: AP-BLDG 12 easily correlated with the building number painted on the DISA headquarters. Such information could help an intruder "launch a 10-second [denial-of-service attack] against the DISA [access point], knock it out, set up their own [access point] with the SSID, and DISA would never know," he said.

O'Ferrell said it's both prudent and easy to turn off an SSID.

Joe Weiss, vice president of the network application division at Aeronautical Radio Inc. in Annapolis, Md., which provides wireless communications services to the airline industry, said it's a good idea for DISA to encrypt traffic to and from closed-circuit TV cameras running over an 802.11b wireless system. Operating them in the open would make it easy for non-DISA personnel to take control of the system, he said.

Earlier this year, Weiss said, an 802.11b wireless camera installed by one airline at Dallas/Fort Worth International Airport was inadvertently controlled by personnel at another airline.

Jim Lewis, a technology and public policy analyst at the Center for Strategic and International Studies in Washington, said DISA's security lapse illustrates the problems that the proliferation of wireless systems and devices poses for government and commercial organizations.

"This could happen to anyone, because people are deploying systems before thinking about security," he said. ■

Reporter Dan Verton contributed to this story.

## Stop the Sniffers

*Wireless LAN detection, sniffing and hacking tools have become more sophisticated over the past year and are widely available on the Web. To protect their wireless networks, enterprises should:*

**Disable the Service Set Identifier** on all access points and wireless devices. If an SSID is broadcast in the clear, snoopers could set an access point with the same SSID and route network traffic through their device.

**Encrypt all IP addresses.** Broadcasting IPs in the clear makes it easy for an attacker to determine network topology.

**Encrypt all sensitive traffic** using the 128-bit Advanced Encryption Standard algorithm.

**Sniff their own buildings.** Increasingly, users are making end runs around IT and plugging an access point into the office LAN for convenience.

**Check "war driving" bulletin boards** such as [www.netstumbler.com](http://www.netstumbler.com) to see if their access points have been sniffed and identified.

**Confine the signal** to a building or corporate campus by using tuned, directional antennas in lieu of omnidirectional antennas that come with off-the-shelf access points.





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## BRIEFS

## Sun to Add Patch Tool With Solaris 9

Sun Microsystems Inc. said it plans to include a Java-based software patch management tool as part of its Solaris 9 operating system, which is scheduled to be formally announced May 22 and become available next month. The Patch Manager utility will let users scan their systems for security vulnerabilities and automatically download available patches, according to Sun.

## IBM Builds 1TB Tape, But Use Far Off

IBM said it has developed a prototype tape cartridge that can store 1TB of data, 10 times more than the largest cartridge it sells now. But the 1TB model isn't likely to be ready for production for three to four years because the prototype transfers data at just 15MB/sec., said IBM. Current tape cartridges have data-transfer rates of up to 200MB/sec.

## State Department Gives IT Pact to CSC

Computer Sciences Corp. and a group of subcontractors that includes Microsoft Corp. and Oracle Corp. won an IT services contract from the U.S. Department of State. The contract covers services related to the agency's hardware, operating systems and applications. El Segundo, Calif.-based CSC said the deal could be worth up to \$160 million over five years.

## Airline Web Site Uses Orbitz Software

American Airlines Inc. said it's using reservation and booking software developed by online travel site Orbitz LLC in a new version of its Web site launched last month. Fort Worth, Texas-based American was one of the five airlines that initially funded Chicago-based Orbitz.

Continued from page 1

## Navy Intranet

the program, Mike Hatcher, EDS's N/MCI director for Navy Operating Forces, warned that the current deployment schedule could put the future of the program at risk.

"We have agreed with [N/MCI] director Rear Adm. Charles] Munns ... that ruthlessly rolling seats is the only way for N/MCI to survive and prosper," wrote Hatcher. "Our present way of working ... if left unchanged would spell an end to the N/MCI program by summertime."

The N/MCI program is designed to replace hundreds of disparate Navy and Marine Corps computer networks with a centrally managed setup operated by EDS.

## A Scorched-Earth Rollout?

In addition to an initial 60,000 seats, the Pentagon on May 3 granted the Navy permission to purchase an additional 100,000 seats based on EDS's success in meeting the requirements of the initial test and evaluation phase.

Officials had hoped to have 135,000 seats deployed this year. However, the Hatcher e-mail warned the EDS N/MCI team that the current deployment rate would likely result in

only 60,000 seats being operational by the end of the year, leaving the program open to criticism and political attacks that could put its future in jeopardy.

In fact, Hatcher referred to a meeting between Munns and Al Edmonds, president of EDS's government information solutions division, during which Edmonds reportedly characterized the new deployment plan as "a scorched-earth seat rollout."

Rick Rosenberg, EDS's program executive for N/MCI, downplayed the e-mail, calling it a "rallying cry for the troops" that used inappropriate language.

Part of the EDS/Navy "scorched-earth" deployment plan includes a directive to EDS installers to no longer wait for security certifications to make their way through the various bureaucratic layers of the Navy before beginning installation of N/MCI seats. Instead, EDS employees will now install N/MCI systems simultaneously while waiting for the Navy to issue final, signed Interim Authority to Operate letters. Any application that fails or is expected to fail security certification, or that doesn't run on Windows 2000, will be automatically installed on a kiosk separate from N/MCI, "no questions asked," according to Hatcher's e-mail.

## One Navy Unit's Struggle With N/MCI

Susan Keen is CIO at NAVAIR in Patuxent River, Md., the first Navy command scheduled to switch to N/MCI-based IT services. Keen recently ordered a halt to deployment until significant technical problems could be fixed.

In an internal May 6 memorandum obtained by *Computerworld*, George Kalnasy Jr., the N/MCI transition manager for NAVAIR, outlined major technical problems that have made the switch to N/MCI "painful" for the organization's IT workers (see "Issues and Answers" box above).

"It has been painful for the NAVAIR folks who have built and delivered successful IT capabilities

to the Navy," wrote Kalnasy, adding that "inoperative functionalities" have made N/MCI ineffective.

According to a source at NAVAIR, which is one of the major test beds for N/MCI, two-thirds of the organization's users have been forced to use two computers - one to access N/MCI and one for various legacy applications that either haven't passed security testing or don't run on Windows 2000.

The Kalnasy memo states that as of May 3, the major challenges facing NAVAIR included problems with its Remote Access Service that affected 675 out of 1,096 users; legacy applications that weren't fully operational, requiring

## Issues and Answers

These are the problems cited in internal memos dated April 25 and May 6, with responses from EDS and Navy spokesmen:

**1. The current deployment schedule could result in failure of N/MCI by summer.**

**Navy Capt. Chris Christopher, deputy director for plans and oversight of the N/MCI program:** "There have been a lot of distractions. It's been like a dog sled with all of the dogs running in different directions. But we have to roll out seats."

**2. NAVAIR's Remote Access Service (RAS) isn't working.**

**Rick Rosenberg, EDS's program executive for N/MCI:** "We had a RAS problem, but N/MCI remote access works. For NAVAIR, there's an additional functionality that has to be bolted on for calendaring and scheduling. However, RAS at NAVAIR is fixed."

**3. Legacy applications aren't fully operational. This requires users to use a second desktop or a kiosk.**

**Christopher:** "The legacy applications [challenge] is something the Navy did not understand when it started the N/MCI effort. We've since started a Navy application database task force. Kiosks are part of the transition."

**4. Secure Web site access isn't operational.**

**Rosenberg:** "Secure Web access is a Navy policy issue that needs to be resolved."

**5. The ability of the Network Operations Center help desk to solve problems in a timely manner is a major problem.**

**Rosenberg:** "A limited number of users were impacted." The problems, mostly a matter of training, have since been resolved, he said.

Although a staff member of the House Armed Services Committee has been reviewing the contents of the e-mail for what one Capitol Hill source called "at best an overzealous e-mail and at worst possible violations of federal or Defense Department security policy," EDS and Navy representatives vehemently denied that any policy infractions took place or

that the program has hit a major snag.

"We do not connect anything to N/MCI without the Navy's approval," said Rosenberg. In addition, "there may have been an isolated incident [causing delays], but that is not the status today," he said.

## Technical Snags

However, there have been recent technical snags. In one major instance, glitches caused the CIO at the Naval Air Systems Command (NAVAIR), one of the first Navy organizations to use N/MCI, to temporarily halt deployment until the technical problems could be fixed (see article at left).

Such problems and delays shouldn't be downplayed, said an IT industry lobbyist and vocal supporter of the N/MCI program who regularly meets with lawmakers on Capitol Hill to discuss the contract.

EDS kept falling further and further behind due to the testing delays and because of the large number of legacy applications that had to be dealt with, the source said, adding that "the delays were killing this contract." ■

the use of a second desktop or kiosk; nonoperational secure Web access; and problems with the ability of the help desk to solve problems in a timely manner.

Rick Rosenberg, program executive at EDS, the Navy's prime N/MCI contractor, said that all of the NAVAIR problems have been fixed and that the company has since started deployment of additional seats.

Navy Capt. Chris Christopher, deputy director for plans and oversight of the N/MCI program, acknowledged that NAVAIR "has proved to be a real technical challenge." However, any statements by users that the program isn't working or in danger of imminent failure "simply aren't accurate," he said.

- Dan Verton



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## The difference between success and failure

**Bob Cottom**  
Chief Integrator, SchlumbergerSema

"We have hardware that comes from everywhere.  
HP OpenView software holds it together."



is 1/1000th of a second. And with so much at stake, IT managers at SchlumbergerSema can't waste time when it comes to wiring some of the world's largest sporting events.

Which is why they head to best-of-breed vendors. Servers, PC's, printers, routers, switches and databases are spec'd from the usual suspects, but they also need comprehensive management software to tie all of this disparate hardware together.

And in one recent case, HP OpenView management software perfectly fit the bill.

The assembled infrastructure handled everything from security check-ins to live time stats to e-mail intranets for athletes, coaches and statistic-hungry media—instantaneously. That meant up to 25,000 different system interfaces, including 10,000 live nodes, all controllable from a centralized mission-critical data center. All told, thousands of workers and millions of viewers had real-time stats, updates and forecasts—the instant points went on the board. (Incidentally, the computer system took care of that too.)

Whatever the event, keeping all these plates spinning is always quite a challenge, and HP OpenView handles it by providing monitoring systems that spot trouble and avert downtime. And with so much always riding on so little time, SchlumbergerSema can't spare an instant for a single system holdup.

HP infrastructure solutions are engineered for the real world of business. Because the last time we checked, that's where we all work. For more information on how HP OpenView software can keep your business racing along, call 1.800.HPASKME, ext. 246. Or visit [www.hp.com/go/infrastructure](http://www.hp.com/go/infrastructure).

Infrastructure: it starts with you.



## BRIEFS

## HP Turns Q2 Profit

Despite a tough economy and a bitter proxy fight, Hewlett-Packard Co. met analysts' expectations as it reported a profit for the second quarter in its last earnings report before its merger with Compaq Computer Corp. HP reported revenue of \$10.6 billion, or a decline of 9% from last year's numbers for the second quarter. The company announced earnings per share of 25 cents, down slightly from 29 cents per share in the first quarter.

## SEC Expands CA Accounting Probe

The Securities and Exchange Commission (SEC) is formally investigating Computer Associates International Inc.'s accounting practices and has issued subpoenas to outside parties for relevant documents, CA disclosed last week in a regulatory filing. The SEC filing came the day after Islandia, N.Y.-based CA reported a \$238 million net loss on revenue of \$772 million for its just-ended fourth quarter.

## Sun ONE to Offer Yahoo Content

Under a deal announced last week, Sun Microsystems Inc. will integrate Sunnyvale, Calif.-based Yahoo Inc.'s Enterprise Edition portal into its Sun ONE Portal Server, tying together content users might want with the custom portals their employers want them to use at work. After a 120-day free-trial period, customers will be able to subscribe for continued service on a per-seat or per-CPU basis. The typical cost is \$200,000 to \$300,000 for an average-size company, Yahoo said.

## E.piphany Cuts Jobs

Customer relationship management vendor E.piphany Inc. in San Mateo, Calif., laid off about 15% of its 660 employees in an attempt to cut costs and meet its year-end goal of being profitable.

## Cisco Takes Another Shot at Storage Over IP

Returns to marketplace with new router

BY LUCAS MEARIAN

CISCO SYSTEMS INC. last week released an iSCSI/Fibre Channel over IP storage router that analysts say maps out the company's direction in the storage networking marketplace.

The Cisco SN 5428 storage router will allow enterprise workgroups to create storage-area networks (SAN) using a combination of Fibre Channel, Gigabit Ethernet and SCSI over IP (iSCSI) protocols over an IP network.

The 5428 is Cisco's second foray into the storage over IP market. In April 2001, Cisco released the 5420, a gateway device that connected Fibre Channel storage devices over

an IP network. That, said analysts, was a trial balloon in the Fibre Channel connectivity marketplace that proved to have few takers.

The 5428, priced at \$11,995, comes with two Gigabit Ethernet ports, eight Fibre Channel ports and three management ports.

## A Midpoint Release

Tony Prigmore, an analyst at Enterprise Storage Group Inc. in Milford, Mass., said the 5428 router is a midpoint iteration between the 5420 and the upcoming release of a multiprotocol, highly intelligent storage switch from San Jose-based Andiamo Systems Inc., a storage networking vendor that's mostly owned by Cisco.

The Andiamo project, according to industry experts, is still in stealth mode.

Mike Kahn, chairman of The Clipper Group in Wellesley, Mass., said Cisco's foray into the storage space is driven by the evolution of iSCSI as much as anything else.

iSCSI takes SCSI commands and data and encapsulates them in IP packets for transport over networks. Cisco and other storage over IP vendors, such as San Jose-based Nishan Systems Inc., are still awaiting the release of the iSCSI standard. It's expected to be out by the end of the summer.

Also, iSCSI network interface cards have yet to be released in quantity. Without such cards, the burden of off-loading the TCP/IP commands falls on the server, eating up enormous amounts of CPU cycles.

But Kahn said Cisco's new

## SAN Plan

THE SN 5428 OFFERS:

- Eight 10 or 20 bit/sec. Fibre Channel ports
- Two iSCSI ports for midrange servers to extend the SAN to low-cost servers
- Logical unit number mapping and masking
- Support for 10 to 40 servers running midrange applications such as e-mail and relational databases

router "could ease some of the problems that are driven by direct-attached storage."

"What we're tackling here is the next tier of data [such as e-mail traffic] that needs to be maintained but for whom laying a lot of Fibre Channel does not justify the expense," Kahn said. ▀

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## Oblix CEO: Microsoft Easiest to Work With

Says his firm will join Liberty Alliance

BY DON TENNANT

IT industry veteran Gordon Eubanks spent 15 years as CEO of Symantec Corp. and is now president and CEO of Oblix Inc., an identity management tools provider in Cupertino, Calif. Eubanks recently spoke with *Computerworld* about a range of controversial issues, including his view of Microsoft Corp. as an easy company for vendors to work with.

Microsoft's .Net Passport and the Sun Microsystems Inc.-backed Liberty Alliance do user authentication. Oblix does identity management. What's the difference? The difference is that Passport and systems like that are focused on identifying a person — au-

thenticating who they are. Oblix is focused on helping enterprises apply that identity to business problems and being able to do this with a very low cost of ownership and with high security. So we're very complementary with Passport: You can integrate Passport right into what we do.

In fact, in February, you teamed up with Microsoft on Passport. How was that alliance formed? Microsoft has had for 20 years a very concerted effort at working with independent software vendors to support [Microsoft's] initiatives. I've always been outspoken in saying they were probably the easiest company to work with. If you don't support their ini-

tiatives, they don't work with you, but that doesn't seem totally wrong to me.

Why haven't you joined the Liberty Alliance? We are joining it.



EUBANKS: Oblix's technology is "very complementary with Passport."

We're not joining it at a high level. We can't afford to play at the top level; we're a small company, [and] it's not a great use of our resources. But we're getting great support from the Liberty Alliance. We get the information we need, and when actual implementations exist, I'm sure we'll be there supporting them. Right now, though, there are real implementations of Passport.

Microsoft's not pressuring you in any way to stay away from the Lib-

erty Alliance? I don't actually work directly with Microsoft much, but I want to say that in all the meetings I've been in, it's never come up. And I know some senior people.

Microsoft Chairman Bill Gates asked you in 1999 to testify at the antitrust trial. Do you think you were unfairly painted as a Microsoft apologist after that? I really don't think it's fair to say I'm a Microsoft supporter as much as I'm a supporter of what's happening in the industry. I don't think that was the press's brightest moment of being open-minded.

Novell Inc. is one of the original investors in Oblix. Are you doing anything with Novell? Well, they first have to figure out what the hell they're going to do. ▀

## MORE GORDON

Read the full text of the interview with Gordon Eubanks online.

QuickLink: 29650  
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**Frost & Sullivan declares Cable & Wireless  
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**Current Analysis recognizes Cable & Wireless  
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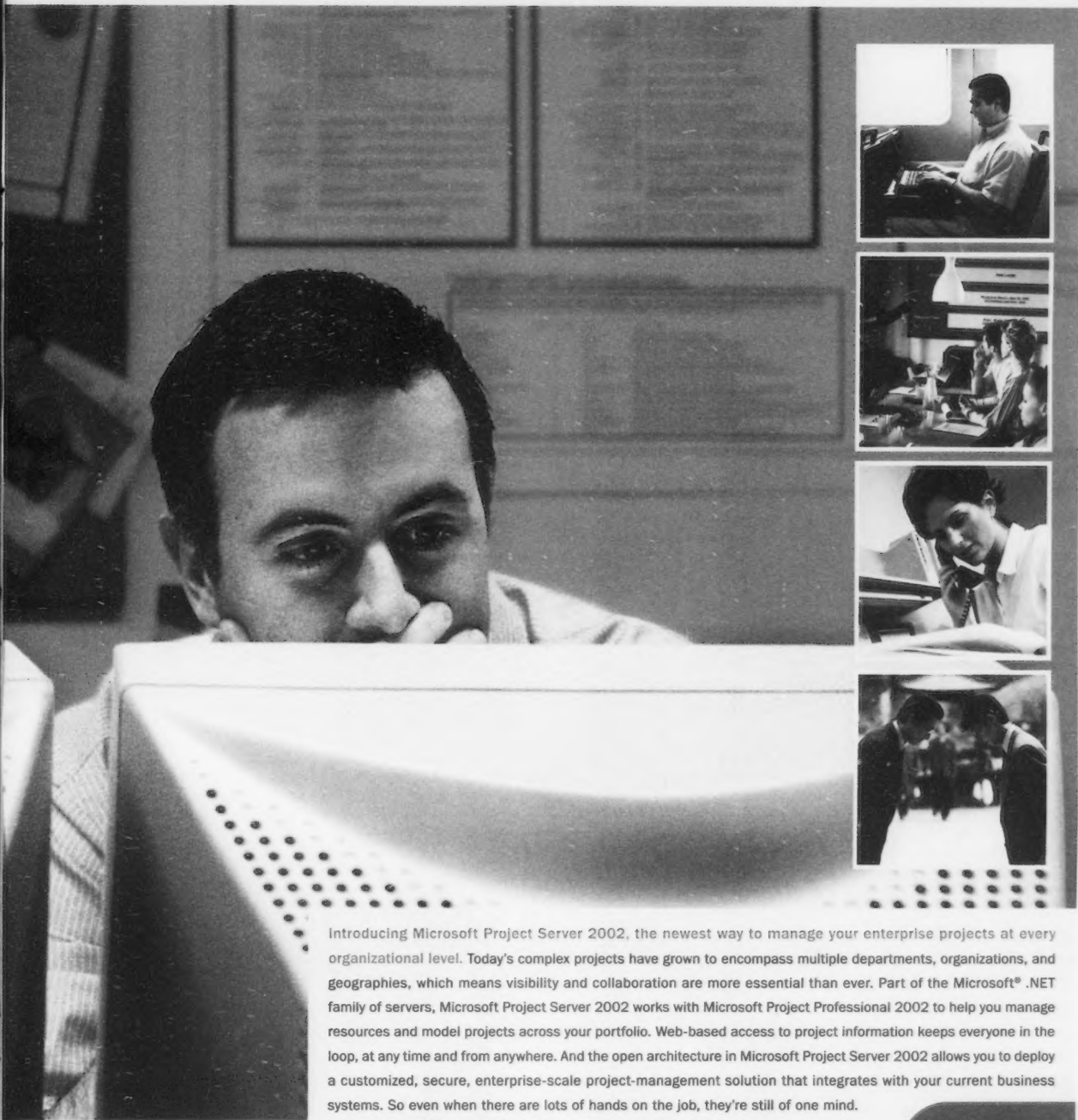
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**Now the left hand  
knows what the right  
hands are doing.**



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**Microsoft**

MARYFRAN JOHNSON

# 'Best Places' Backlash

**W**E HAD BARELY published our Best Places to Work in IT report two weeks ago [QuickLink: al970] when the angry e-mails and phone calls started to come in. "Are you serious? This company is a horrible place to work!" wrote one IT worker at Aetna (No. 49 on our list). In another note, an employee at Comerica (No. 9) scoffed at our naiveté in believing

the executives we interviewed. "Your visit there was scripted, the people you spoke to were pre-selected and the impression you left with was misled," this one wrote. I also heard from an anguished manager at MindTree Consulting (No. 66), who had an extensive, heartfelt list of problems with his employer.

But by far the most organized, vociferous objections — more than two dozen protests at last count — came from current and former employees of Electronic Data Systems (No. 32). We heard from people who have gone public with their complaints online on Vault.com, Yahoo message boards and EDSlawsuits.com. On the page opposite, we've published a few of their letters.

Of course, complaints from a handful of unhappy IT people out of the 62,000-plus IT workforce at EDS has to be kept in some perspective. "These folks obviously feel very passionately about what they believe, and in many ways, it's hard to respond," EDS CIO Terry Milholland told me last week. "This is not your father's EDS, where you can stay for 30 years and get rewarded for longevity."

The IT services giant has changed many of its human resources policies since 1999 to create a "meritocracy" that richly rewards top performers and limits severance pay to a couple



MARYFRAN JOHNSON is editor in chief of *Computerworld*. You can contact her at [maryfran.johnson@computerworld.com](mailto:maryfran.johnson@computerworld.com).

of weeks at best. The money saved on severance packages, in fact, pays for those top-gun bonuses.

In exchanging notes with our Best Places protesters, I've found many of them to be reasonable people despite their lingering hurt and anger. They've offered useful ideas for improving our survey with more direct

feedback from rank-and-file workers.

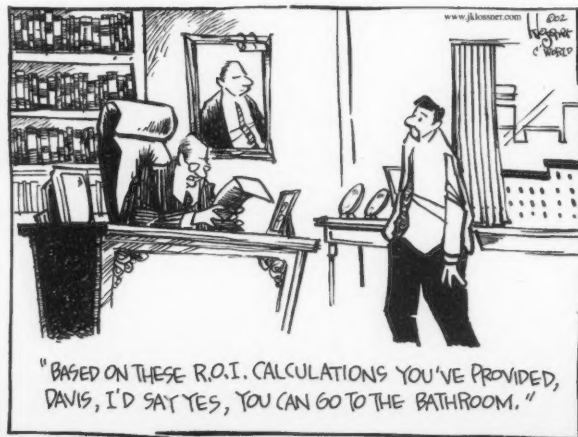
"I see your dilemma: You acquire a lot of information on a lot of companies, and because of your limited resources, rely on the integrity of those answering," wrote one critic

with the colorful log-on of Sitting-DuckatEDS. "The problem is, you are asking the fox to guard the hen-house and report back to you."

It's true that we do rely on company executives and managers for much of the information we gather. But our 75-question survey has actually grown over the past decade as we've added numerous questions suggested by readers.

We collect dozens of facts about each firm, including IT budget, company revenue, merger history and changes in IT staffing levels. We ask for specifics on employment benefits, retention programs, recruiting methods, bonus history and mentoring. We find out how many women and minorities work in the IT department, what training options are available and what kind of IT projects are most valued. We sort all this information with a database program and then pipe it into an Excel spreadsheet to determine the rankings.

At the end of it all, any awards program is a beauty contest where appearances count more than reality. Judging whether a company is truly a great place to work is a tough call for outsiders to make. But with your help, we'll keep trying. ▀



PIMM FOX

## Back to School For IT Workers

**T**HE IT WORKFORCE will need 1.1 million new workers this year, according to the Information Technology Association of America, but 600,000 of those positions will go unfilled. The reason: no qualified applicants.

Patricia Keefe addressed this issue here last week, but I want to approach it differently. It's not that we don't have talented workers; rather, they lack the balance of management experience and technical skills employers seek.

Roger Schank, chief education officer at Carnegie Mellon University's new West Coast campus, says much of the problem is experience. "I hear from companies who say they have kids with IT skills in positions of power who don't know how to manage,

but they're running a group and making bad decisions," says Schank. Carnegie Mellon is trying to do something about the problem by reinventing graduate-level education for IT professionals through courses created in conjunction with businesses.

Schank says doctoral students learn what professors are researching, while undergraduates learn standard material. "Which leaves the master's level as middle ground," he says. A master's degree program must be practical to be valuable in the workplace while engaging enough to hold the attention of IT professionals who groan at the prospect of sitting through lectures.

Indeed, Lewis Temares, dean of the College of Engineering at the University of Miami, says it's valid to make the distinction between education as opposed to training. "There's a huge difference and a place for both," he says. Education gets you thinking after you learn the foundation, Temares told me, adding, "The question is, When stu-



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For more columnists and links to archives of previous columns, go to [computerworld.com/columns](http://computerworld.com/columns)

dents finish, will their diploma and knowledge be comparable to a student on the campus in a regular program?"

That's why Carnegie Mellon's project-based approach in Silicon Valley will pair courses with real-world company needs and still offer classroom time, in an 80/20 mix, with real-world situations getting the most time.

Lockheed Martin is Carnegie Mellon's first partner for the new master's degree in IT management. The curriculum forces students to take on different roles on a software project team, grooming them for leadership positions and promoting project management skills. Dorothy McKinney, chief software architect for Lockheed Martin's missile and space operation, spent 12 years teaching at San Jose State and Portland State universities. She says students on a project team, where each has the opportunity to lead and teach the others, learn more than they would just listening to lectures.

Companies should take the initiative with higher education institutions to tailor degree programs to suit their needs — and encourage and financially support workers to set higher educational goals.

In a recession, it's a shame for IT jobs to go to waste for lack of qualifications. ■

DAN GILLMOR

## IT Buyers Can Cash in — to a Point

**T**HE TECHNOLOGY industry's woes have given corporate IT buyers a rare opportunity. And if they don't translate that leverage into good deals now, they never will.

Vendor flexibility has reached a high point, as prices have rarely been more negotiable. But price is just one of many components of a useful product or service.

For example, consumers are learning to their dismay that many free Internet services come with a catch. Few of the providers of those services have offered useful customer service. Some have disappeared entirely. Others are reneging on privacy commitments in an effort to make money by peddling customers' information. Or they're starting to charge for their services.

No sensible IT person minds paying

for a product or service. What everyone should object to is paying for a lousy one or being forced into unacceptable terms.

Yet in recent years, some sellers, Microsoft in particular, have bludgeoned buyers. Microsoft may have flouted the law, but it had the assistance of its own hapless customers, who never seemed to understand the consequences of assisting the monopolist by being so shortsighted.

Even in a weak economy and an even weaker industry climate, Microsoft is still telling customers what to do. The latest orders are to change licenses in ways that are good for Microsoft but not for its customers.

At least a few customers, finally confronting the consequences of supporting a monopoly over the years, have said no. (Sun's increasingly interesting



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That's why the industry has pushed so hard for UCITA, the Uniform Computer Information Transactions Act. This pernicious law, enacted so far only in Maryland and Virginia (and there with some conditions attached), tilts the balance even further toward sellers and away from buyers and has been properly denounced by just about everyone but the technology industry.

IT should seize this chance, not just

StarOffice suite is providing some of the backbone, it seems.) More should do so. And all who do sign new license agreements should insist on major changes to restore a little of the balance that once existed but has shifted so dramatically.

This applies to all vendors, not just Microsoft. Face it: The big ones would all behave in much the same way given the opening.

## READERS' LETTERS

### Ranking EDS

**R**EGARDING YOUR report on the Best Places to Work in IT, it would seem you have been provided some bad information on EDS [QuickLink: al970]. I have worked at EDS a number of years. I haven't seen the mentoring, internships, flextime, performance bonuses or rewarding work environment. We have had week after week of layoffs and are told more are to come. Lots of people have gone years without pay raises, in spite of consistent quality work. Jobs are being moved offshore. If you're in the senior executive leadership of the company, then, yes, most of your article is probably accurate. I don't know of any employees who would recommend EDS as a place to work.

**Name withheld**  
Analyst  
EDS  
Plano, Texas

**I** WAS ABSOLUTELY astounded by EDS's ranking. I worked for EDS for seven years, routinely working nights, weekends and

holidays and never receiving any compensation for any of the overtime. I applied twice for educational assistance to upgrade my skills and was turned down on both occasions. I finally took a loan against my 401(k) for the retraining I wanted. I was told on March 19 that my job would be outsourced on May 1, despite a "valued contributor" performance evaluation complete with glowing remarks from the customer and a 5% pay raise effective March 1. I began searching for another job and found one, thankfully. When I resigned, management listed the reason for my leaving on a state form as "terminated — refused to perform assigned work." I received no severance, no letter of reference and none of the usual reduction-in-force benefits. I am relieved to be an ex-EDSer. You might want to check out the EDSLawsuits.com Web site. **Michael A. Chancey**  
Atlanta

**Y**OUR ARTICLE on EDS as a Best Place to work is a joke. EDS is committed to three things:

diluting salaries, reducing benefits and eliminating retirement. If that's a good employer, I'm the queen of England.

**Richard Randall Mohler**  
Midland, Mich.  
rrmohler@diamondcs.net

### Best Places for Whom?

**Y**OUR RECENT Best Places to Work in IT report is grossly misnamed. According to the methodology, you surveyed "CIOs, vice presidents and IT directors" and compiled their responses. So what you have is the list of the places that CIOs, vice presidents and IT directors think are best, not what the people who actually work for a living think.

**Tom Gillespie**  
Atlanta

### Calculating Server Stats

**"I**S USAGE May Not Be as High as Survey Says," but then again, neither is Apache's [QuickLink: 29453]. Apache proponents have long been using these numbers knowing full well that they included a large

to extract better terms and conditions from its vendors, but also to help put a stake once and for all into the UCITA menace, which keeps coming back like a legal Dracula even when we assume it's dead. Every buyer should make clear to sellers that their continued support of UCITA is a strongly negative point in contract negotiations.

But while many in the high-tech industry have abused their positions, that's no excuse for IT buyers to abuse theirs now.

The risk today is that IT will take its leverage too far, insisting on terms that could threaten the ability of providers to do their jobs right, or at all, in the long run. Getting a good deal today isn't worth it if the ultimate result is even worse conditions.

Markets are never — and shouldn't be — perfectly balanced. But a market that moves from one extreme to another can be just as dangerous, since it can create a disincentive for suppliers. ■

number of parked domains. It's hypocritical that they cry foul when the same misleading stat they used against Microsoft is used against them. Microsoft can provide an impressive number of companies that use IIS as their frontline Web server; so can Apache and iPlanet. A better metric would be to understand, per site, the number of *dynamic* page views per day and the Web server used, and per site, the number of *static* page views per day and the Web server used. The Netcraft survey is OK, as long as you understand the context.

**Michael J. Geiser**  
Oaks, Pa.

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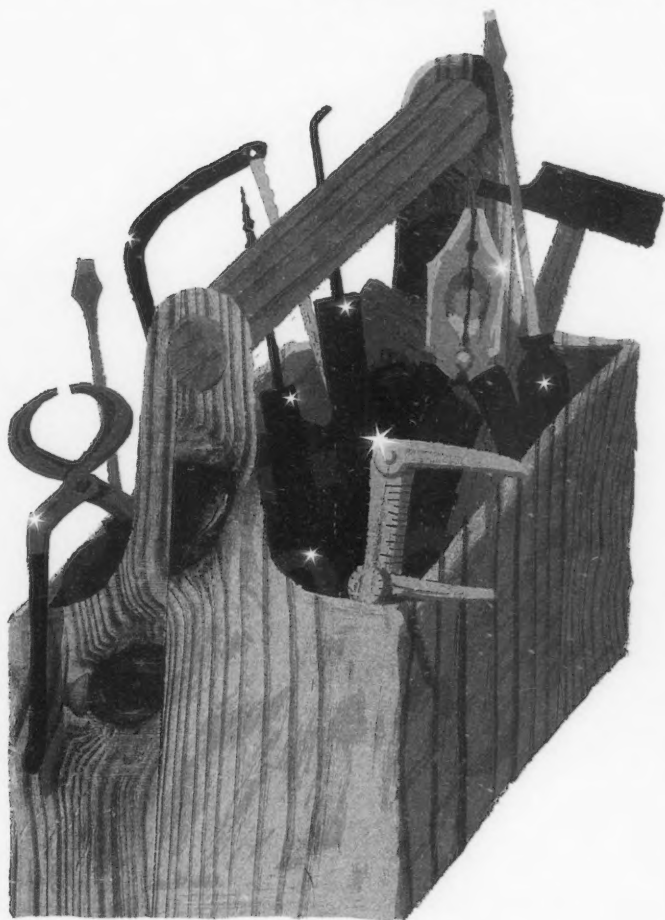
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# New Tools, New Choices

**SPECIAL  
REPORT**

Java or .Net? Which tools for Web services? Here's a guide for making those big decisions.

## EDITOR'S NOTE

**Y**OU HAVE some unusually big, bet-your-career decisions to make regarding software development these days. Do you migrate to Microsoft's new .Net environment, or move to Java 2 Enterprise Edition? Or, if you'll inevitably have a mix of both, what should that mix look like?

The emergence of Web services as The Next Big Thing has also given IT managers a lot to think about. Vendors (and some publications) are touting Web services as an IT panacea and a paradigm-shifter.

But *Computerworld* approaches this much-hyped topic with a healthy dose of skepticism: Some of our earliest stories on Web services warned of security and reliability problems [QuickLink: 26695]. Indeed, using the words *security* and *Web services* in the same sentence can cause laughing fits in the newsroom.

On the other hand, we know that pioneering users, such as CitiMortgage, a division of financial services giant Citigroup, are making a major commitment to Web services because of the benefits of reusable software components. The benefit for CitiMortgage is about 6,000 hours of programmer time saved each year.

As it turns out, security for Web services (OK, I'm holding back the giggles) isn't a black-and-white issue. As Robert L. Scheier explains in his article (page 40), some companies are plunging into Web services anyway because the information at risk just isn't very sensitive and the benefits are so great. Current security protocols are "good enough" for these applications.

It's a great example of how conventional wisdom can be wrong, or at least too simplistic, because businesses and IT environments vary a lot. That's why we keep interviewing IT managers: to learn what really works in a variety of business settings, because sometimes we hear surprising things.

And then we share those findings with you, in special reports like this, to help you make those big decisions. ▀

Mitch Betts ([mitch\\_betts@computerworld.com](mailto:mitch_betts@computerworld.com)) is director of Computerworld's Knowledge Centers.

## KNOWLEDGE CENTERS ONLINE

Knowledge Centers are the places to find practical information about specific technologies and IT topics. In addition to this monthly Special Report in print, there are numerous resources online in our Development Knowledge Center, including research links, glossaries, white papers and the following online features:

**Grady Booch:** In a wide-ranging interview, one of the gurus of software development describes the flaws of Web services and the future of object-oriented programming.

**Case studies:** Three organizations - from the transportation, defense and financial services industries - describe how they're earning ROI from their software projects.

**Industry views:** Executives in the development tools business sketch out the future of Web services, mobile applications and software quality.

**QuickLink: k1100**  
[www.computerworld.com](http://www.computerworld.com)

**"CODE AND FIX."** That was the way most business applications were developed in the mid-1960s. Two decades had passed since John von Neumann had suggested controlling computers with programs stored in memory instead of patch wires in 1945, and the prototype computer named Baby at The University of Manchester in England had successfully run the first stored program in 1948. But application development was still a pretty haphazard process.

Yes, there were high-level programming languages. Fortran was developed by John Backus at IBM starting in 1954, and IBM began selling Fortran compilers in 1957. Remington Rand Inc.'s Univac offered Grace Hopper's Flow-Matic language for business applications in the late 1950s, and that language became the basis for Cobol in 1959. And in 1964, IBM unveiled its "all-purpose" language, PL/I, which had elements of Fortran, Cobol and Algol.

### Sabre Takes Off

But there was virtually no commercial software industry. Data processing departments had no choice but to build their own applications — and with few standards or best practices, building a large application was a costly, error-prone process. When Fort Worth, Texas-based American Airlines Inc. built the first version of its Sabre reservation system from 1960 to 1964, it required 400 man-years of effort at a development cost of almost \$40 million.

That started to change in 1965, when Dutch researcher Edsger Dijkstra began publishing journal articles suggest-

# The Story So Far

Development techniques have evolved from haphazard to highly structured to fast-paced Extreme Programming. By Frank Hayes

ing a more structured approach to programming. Other researchers proposed improved ways of planning and managing projects, and in 1970 W.W. Royce proposed the "waterfall" structure for dividing large projects into well-defined phases.

Structured programming got its first major test in the early 1970s, when a team of IBM programmers led by Harlan D. Mills wrote a computer system for *The New York Times*. The huge project was delivered on schedule and with a minimum of bugs — an astonishing accomplishment for the time.

And throughout the '70s, tools and techniques for software development came thick and fast: Tom DeMarco's structured design and analysis, Niklaus Wirth's Pascal, Larry Constantine's

structured design, Clive Finkelstein's Information Engineering and many others. By 1982, researchers counted 48 different software development methodologies in use.

Meanwhile, the cost of computer hardware was dropping — and the demand for faster and cheaper application development was climbing. In 1962, before the improvements in software development, software was still only 20% of the cost of a typical computer system. By 1985, software was 80% of the cost — four times as much as the hardware.

That shift drove a demand in the late '80s for computer-aided software engineering (CASE) tools that would automate application development methodologies and, in theory, cut both sched-

ules and bugs. But in most corporate data processing shops, '80s-era CASE would never catch on. Huge mainframe-based systems had already been built and maintained successfully for years by programmers who weren't about to let the computer — in the form of CASE tools — tell them what to do.

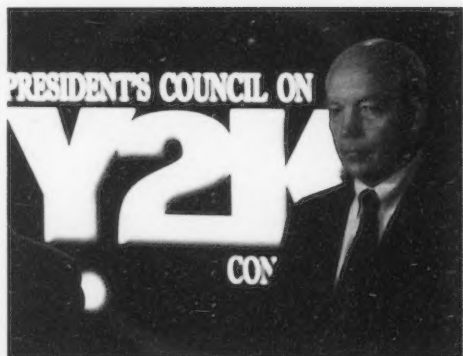
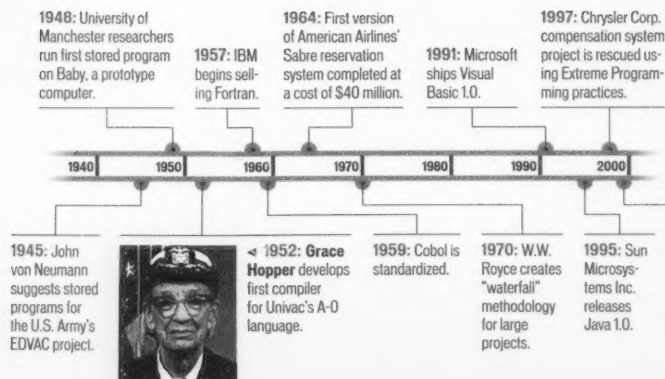
### Enter: PCs and LANs

Meanwhile, PCs and their networks were arriving in large organizations, and with them the need to replace aging terminal-based applications with client/server versions. When Microsoft Corp. shipped Visual Basic in 1991, programmers' attention shifted to the graphical user interface on the desktop. And, with spreadsheets' ability to access corporate databases, developers were learning to focus on building connections instead of building everything from scratch.

The 1990s saw the buy-instead-of-build approach spread from the desktop to enterprise applications — just as the World Wide Web was suddenly creating the need for a new generation of custom-built Web programs for customers to use. Meanwhile, \$1 trillion in resources was thrown at programming's most infamous fiasco, the Y2k problem.

Today, application development means wiring Web sites to packaged software and legacy systems, integrating Web services with existing applications — and working with ever-faster programming techniques with names like Extreme Programming, Crystal and Scrum.

And now, on with the story ...



▲ 1999-2000: The year 2000 date rollover problem requires expensive code fixes and raises public alarm. White House Y2k czar John Koskinen coordinates the government's response.



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Five big decisions you'll need to make when choosing which development tools to use where. By Carol Sliwa

**T**HREE YEARS AGO, TD Bank Financial Group decided to go with Java as its enterprise development platform, in large part because it wanted its application code to be able to run on different types of hardware.

But Claudia Radasanu, senior vice president of development services, says the Toronto-based financial institution must now investigate the rival .Net environment that Microsoft Corp. launched in February — even though her firm made a huge investment in IBM's Java-centric WebSphere application server and has no immediate plans to make costly changes.

"What if the total cost of ownership is lower on .Net? You always have to ask the 'what if,'" Radasanu says.

Corporations will find it tough to settle on a single development architecture such as .Net or Java 2 Enterprise Edition (J2EE), "unless they are the size of a dentist's office," says Yefim Natis, an analyst at Gartner Inc. in Stamford, Conn.

Mixed environments of mainframes, Unix, Windows and proprietary systems will drive most enterprises to use both J2EE and .Net, particularly if they've been involved in mergers and acquisitions, some analysts say.

"The question is not whether J2EE or .Net is the better architecture," Natis says. "The question is, How to integrate them, how to make them work together, what are their strengths and weaknesses?"

Some IT shops may use .Net for some types of new projects and Java for others. Others may explore using .Net for the presentation layer, to take advantage of Microsoft's client-building tools, or to connect to Java-based business logic via XML-based Web services or a Java/Microsoft bridge.

Whatever the choice, Randy Heffner, an analyst at Giga Information Group Inc. in Cambridge, Mass., recommends

that corporate users decide on a primary platform and use "a containment strategy" for the other platform. He says that will allow an IT department to get greater synergy of development, operations and application management skills.

The following are some points that IT managers should consider when weighing the choice of .Net vs. Java:

**1 Weigh the importance of application portability to your company.** Java may not have entirely lived up to its "write once, run anywhere" promise. But Heffner says J2EE portability tends to be good for core components such as business rules, Java Server Pages and Enterprise JavaBeans.

That, in turn, gives corporate users the negotiating leverage to present "a credible threat" that they'll move an application to another vendor's platform, something they can't do with Microsoft, because the .Net framework runs only on Windows, he says.

Microsoft submitted a portion of its .Net framework to a standards body, but Heffner estimates it amounts to only 10%, or "just enough for an application on some other platform to connect to a Microsoft server environment." Although there are open-source efforts to get .Net to run on other platforms, none are credible yet, he adds.

Portability has never been a concern for Microsoft, which advocates writing applications optimized to run on Windows for higher performance. Claiming that interoperability is more important than portability, Microsoft now tells users that .Net-based applications can share information with applications running on other platforms through Web services, in which XML-based messages are sent via the Simple Object Access Protocol.

Bob Dutille, a senior vice president of enterprise architecture at Cleveland-based KeyCorp, says he's interested in

# .Net vs. Java



## Pros & Cons

J2EE	
PROS	CONS
<ul style="list-style-type: none"> <li>■ Runs on any operating system and application server (may need adjustments)</li> <li>■ Handles complex, high-volume, high-transaction applications</li> <li>■ Has more enterprise features for session management, fail-over, load balancing and application integration</li> <li>■ Is favored by experienced enterprise vendors such as IBM, BEA, SAP and Oracle</li> <li>■ Offers a wide range of vendor choices for tools and application servers</li> <li>■ Has a proven track record</li> </ul>	<ul style="list-style-type: none"> <li>■ Has a complex application development environment</li> <li>■ Tools can be difficult to use</li> <li>■ Java Swing environment's ability to build graphical user interfaces has limitations</li> <li>■ May cost more to build, deploy and manage applications</li> <li>■ Lacks built-in support for Web services standards</li> <li>■ Is difficult to use for quick-turnaround, low-cost and mass-market projects</li> </ul>

.NET	
PROS	CONS
<ul style="list-style-type: none"> <li>■ Easy-to-use tools may increase programmer productivity</li> <li>■ Has a strong framework for building rich graphical user interfaces</li> <li>■ Gives developers choice of working in more than 20 programming languages</li> <li>■ Is tightly integrated with Microsoft's operating system and enterprise server software</li> <li>■ May cost less, due in part to built-in application server in Windows, unified management, less expensive tools</li> <li>■ Has built-in support for Web services standards</li> </ul>	<ul style="list-style-type: none"> <li>■ Framework runs only on Windows, restricting vendor choice</li> <li>■ Users of prior Microsoft tools and technology face a potentially steep learning curve</li> <li>■ New runtime infrastructure lacks maturity</li> <li>■ Questions persist about the scalability and transaction capability of the Windows platform</li> <li>■ Choice of integrated development environments is limited</li> <li>■ Getting older applications to run in new .Net environment may require effort</li> </ul>

Microsoft's approach, but he wants the option of selecting a best-of-breed server. "One of the reasons we are a Java shop is because Microsoft was too proprietary," he says. "We like to have the opportunity not to be locked into one vendor all the time."

**2** **Take stock of your existing developer skills and infrastructure.** Training developers and ripping out existing infrastructure can be costly, so an IT shop may favor sticking with the development environment that best fits its current situation.

Pacific Life Insurance Co., for instance, didn't hesitate to adopt .Net technology. Brad Sewell, an assistant vice president in IT at Newport Beach, Calif.-based Pacific Life, says his life insurance division didn't consider Java

because the division is "pretty heavily invested in Microsoft infrastructure."

The Home Depot Inc. in Atlanta, in contrast, is primarily a Unix shop and made a significant commitment to Java early on. But the decision wasn't based solely on its Unix focus. "Java ran equally well on all of our hardware," says senior IT manager Curtis Chambers, noting that his company also uses Windows, MVS and z/OS. "The end goal was a common development platform for all of our developers."

Because of .Net's Windows-only limitation, Thomas Murphy, an analyst at Stamford, Conn.-based Meta Group Inc., says that for Unix shops, "the decision's made for you."

"If you're a mixed shop, you have to look at how you are mixed," he adds.

Murphy says IT managers should ask questions such as: Is Unix just the database platform, or does it have a role beyond that? How are you going to attach to legacy resources? Or are you going to try to develop new business logic on the legacy platform?

Microsoft's .Net environment allows developers to program in more than 20 languages, including Cobol, which could appeal to programmers who have worked in legacy environments. But since their .Net applications would need to run on Microsoft's Common Language Runtime, they must weigh the infrastructure consequences.

Developers skilled in using Microsoft's Visual Basic tools for building

less complex applications will find a similar learning curve whether they shift to Visual Studio .Net or J2EE, if they're taking on full distributed computing and object-oriented programming, warns Frank Gillett, an analyst at Forrester Research Inc. in Cambridge, Mass.

Whatever switch is made, it costs money. Gartner analyst Joseph Feiman says a Cobol-to-Java move, for instance, can cost an average of \$57,000 per developer, once training costs, time, initial lost productivity and risk are factored into the equation. But he notes the costs can vary significantly, depending on programmers' skills and the type of change they're making.

**3** **Assess the complexity of the applications you will be building.** Microsoft tools have an edge over Java for building applications that require rich graphical user interfaces and that deliver content to Web browsers, analysts say. Although Java tools are improving, Microsoft's tools are generally considered easier to use.

Heffner says there are "more knobs to turn" in a J2EE environment. But for complex, high-volume applications with lots of business rules, "that's just the sort of knob-turning you need available," he says. Those types of applications need to be more highly architected, and J2EE has more features to offer for session management, fail-over and load balancing than the Micro-

soft architecture does, Heffner says.

For now, analysts say, J2EE may continue to be the preferred choice for highly scalable, mission-critical applications, and .Net may make more sense for applications that need a low-cost, quick turnaround. Natis says Gartner is advising clients to wait for .Net's next release before they consider using it to build an application that will go beyond 1,000 concurrent users.

**4** **Investigate outside vendor support.** Murphy says that users who buy major packaged applications will probably be driven to gain some Java skills, since enterprise software vendors such as SAP AG and Oracle Corp. lean toward Java. Another consideration may be the tendencies of the independent software vendors that develop applications for a particular vertical industry. Heffner says one insurance company chose J2EE because five of its six peers did.

Analysts also note that tools and components may be more readily available for Java now, since .Net is so new. However, Microsoft, has already put out a thick binder entitled ".Net in the Real World," featuring early adopters.

**5** **Compute costs with care.** On a straight cost basis, Microsoft presents an appealing option. Its Windows server operating system ships with a built-in application server, while pricing for the most popular Java-based application servers starts at \$8,000 to \$10,000 per CPU.

There are other options. Hewlett-Packard Co., for instance, ships a free application server with its operating system, and JBoss is an open-source alternative, analysts say. But the top two choices, by far, have been San Jose-based BEA Systems Inc.'s WebLogic or IBM's WebSphere.

Rather than simply looking at the costs of application servers, Heffner advises clients to use a total economic impact model that takes into account costs, benefits and flexibility for future options. "In this case, you're making a strategic platform decision that will affect not only this one application; it will affect the stream of application delivery that you're going to pursue as a company over the coming years," he says. ▀

### SCALABILITY MATTERS

Microsoft continues to battle a perception problem regarding the scalability of the .Net environment.

**QuickLink: 29556**  
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# Building Web Services



## Field Report: Web Services

Tool kits for designing and building Web services have a core set of capabilities, including SOAP messaging integration, plus automated help for WSDL wrappers and debugging distributed Web services.

Choosing the right tools depends on the language and environment. But the most interesting question isn't "Which tool kit?" but "For which application, and how?" When users answer this question they reveal much about the current state of Web services.

BY JON UDELL

## Putting SOAP Tools to Work

### TECH CHECK

For users of the new breed of Web services tool kits, there's a certain sense of déjà vu. Simple Object Access Protocol (SOAP) is, after all, just another remote procedure calls (RPC) protocol; Web Services Description Language (WSDL) is just another interface definition language; and Universal Description, Discovery and Integration (UDDI) is just another directory service.

These new variations on old themes are wildly popular, and for good reason. XML flowing over HTTP makes integrating applications in and across enterprises much more open and flexible than ever before. Web services tool kits have rapidly converged on a core set of functions: They can integrate SOAP messaging with programming languages and application servers, automate the creation and use of WSDL wrappers and test harnesses, and help debug distributed Web services.

Given a rich assortment of competent tool kits, the choice for a developer quickly narrows de-

pending on language and environment. For .Net shops, Visual Studio .Net is the clear choice, though competition will likely increase. For Java shops, the choice is influenced by the Web application server in use and by the application itself.

### A Taxing Experience

ASU Solutions Inc., a Santa Clara, Calif.-based applications developer, used IBM's Web Services Toolkit in conjunction with WebSphere Studio Application Developer to create the ASU eTax Server. This is deployed as a Java 2 Enterprise Edition application to large counties with robust IT infrastructures and is hosted on behalf of smaller counties. The service lets both individuals and institutions pay property taxes via the Web.

With Web services, it's possible to decouple a service like ASU's payment engine from an application's user interface, and ASU does just that. Individuals who use the eTax Server may access it through a Web browser, by way of a translation layer that renders the

**“With Web services, it's possible to decouple a service, like a payment engine, from an application's user interface.”**

—BOJAN VUKOJEVIC, DIRECTOR OF TECHNOLOGY, ASU SOLUTIONS



## Nimble Tool Kits for Lightweight Applications

### FIELD NOTES

Not every Web services tool kit can, or should, deploy the full arsenal of wizards, debuggers and application server hooks. Sometimes less is more. For Java developers, the premier lightweight Web services tool kit is undoubtedly Glue, from The Mind Electric Inc. in Addison, Texas.

One Glue user, Chris Burchett, vice president of engineering at Credant Technologies in Addison, Texas, calls the heavyweight products from IBM and BEA Systems Inc. "the kiss of death for a small start-up that wants to deliver a product this year." Credant is building a product that enforces enterprise security policies on mobile devices. A Web services interface, created with Glue, is wrapped around the policy engine to ensure that integrators can adapt it for a range of enterprise deployments. Although Credant doesn't yet push Web services to the mobile devices themselves, Glue's small footprint bodes well for such a strategy.

Another lightweight tool kit, SOAP-Lite, freeware written by Pavel Kulchenko, was just what Dave Hoover needed to solve a routine integration problem. Hoover, an Internet specialist at the American Medical Association in Chicago, was building an application to enable doctors to manage their listserver subscriptions in a centralized way. Two databases were involved: SQL Server on Windows NT and Informix on Solaris. After failing to come up with a cheap and convenient solution using Perl database drivers, Hoover says, he hit on the idea of using an instance of SOAP-Lite on each box and "was up and running really fast."

**GLUE**  
Credant  
Technologies  
Addison, Texas

**SOAP-Lite**  
www.soaplite.com  
Library by  
Pavel Kulchenko

XML interface as an HTML application. Alternatively, notes Bojan Vukojevic, ASU's director of technology, individuals can access the service directly from a rich client, such as the SOAP-aware version of Excel in Office XP.

Many tax payments are made by banks aggregating funds from several escrow accounts into single payments. Boris Oak, director of sales and marketing at ASU Solutions, says having county clerks process those payments is expensive and prone to errors, but Web services can dramatically streamline the job. Also, Vukojevic says, the UDDI wizard that ASU provides lets counties publish their payment services in a directory, so a mortgage company can look up counties and batch payments on multiple properties, for example.

One thing not yet standardized for Web services is the all-important security context for transactions. ASU has had to create its own authentication system. ▀

Udell is a consultant and writer in Keene, N.H.

### COORDINATING WEB SERVICES

For information on middleware that helps link loosely coupled applications, see:

**QuickLink: 29439**

For additional Web services resources, visit our Web site:

**QuickLink: 29435**  
www.computerworld.com

## Source Code for Successful Services

### CASE STUDY

**WHO THEY ARE:** Consultant and development firm specializing in Web services.

**GOAL:** To offer cost-effective Linux-based Web services to its clients.

**STRATEGY:** Use and extend the capabilities of Borland Software Corp.'s Delphi and its Linux cousin, Kylix.

**CHALLENGES:** The reliability of SOAP messaging is a key challenge for loosely coupled Web services. SOAP, though often transported over HTTP, need not be. Some implementations can transport SOAP over alternate protocols such as file transfer protocol or SMTP. Kazoo Software Inc. President and CEO Alain "Lino" Tadros exploited the openness of Delphi and Kylix to extend SOAP over Microsoft Message Queuing in order to make the asynchronous and transactional features of that protocol available for Kazoo's Web services development projects.

**ISSUES:** A crucial factor, says Tadros,

is access to source code. "I don't like black boxes," he says. "And with the Borland tools, I get 80% of the source right out of the box." For Tadros, the benefits of the Borland tools include a productive integrated development environment, wizards to automate boilerplate coding and a Web-services-oriented debugger that enables the programmer to step through SOAP transactions and inspect or modify messages.

**PAYOFFS:** Kazoo became the first user of Scotts Valley, Calif.-based Borland's Delphi development tool kit to publish a Web service in the XMethods.net registry.

The close relationship between Delphi and Kylix has enabled Kazoo to offer cost-effective Linux-based services. Tadros says one customer running a Delphi-based service accessed from iPaq handhelds by way of PocketSOAP, a lightweight Component Object Model-based SOAP client, hoped to cut costs by switching its server from Windows to Linux. The service was recompiled and ran under Kylix, Tadros says, and now it's hosted under Red Hat Linux using MySQL instead of SQL Server.

**Kazoo Software Inc.**  
Santa Clara, Calif.

## Wide-Angle Searching

### CASE STUDY

**WHO THEY ARE:** IT services provider formed in 1999 from the merging of several Israeli companies.

**GOAL:** To use its expertise with content management technologies from Documentum Inc. in Pleasanton, Calif., and Interwoven Inc. in Sunnyvale, Calif., to develop a multi-tier document-listing service that supports federated search—that is, the ability to search multiple sources simultaneously.

**STRATEGY:** Using a beta version of WebLogic Workshop from San Jose-based BEA Systems Inc.

**CHALLENGES:** Wizards that hack away at the dense underbrush of supporting code are only part of the story. Web services that work robustly can't rely on the synchronous model of HTTP communication, which expects an immediate response to every request.

**ISSUES:** The tool kit's support for asynchronous and long-running calls, Ness says, does as much for a business developer's productivity as the wizards. Alan Zenreich, the company's director of Web services, amplifies the point: "The coarse-grained

and loosely coupled design is best for scalability and availability," he says.

Given the intrinsic unreliability of the Internet as a message delivery mechanism and the stateless nature of HTTP, there's a need to create a "conversational context" for Web services, and WebLogic Workshop addresses that need, Zenreich says. It offers support for fire-and-forget messaging, queuing, registration of callback methods and managed polling for endpoints whose callback addresses are blocked by firewalls.

**PAYOFFS:** Simplifying Java 2 Enterprise Edition development is a key benefit of the BEA tool kit, according to Ness Chief Technology Officer Joe Fung. Freed from "plumbing" concerns, Zenreich has prototyped a service intended to support federated search. In this scenario, a Web-services-enabled client issues an asynchronous query to a search service that in turn issues asynchronous queries to several different Web-service-enabled document repositories. Maintaining context in each tier means that a client can refine a search without requiring the searcher to requery its sources, and the searcher can assemble results incrementally without waiting for all sources to return complete results.

**Ness Technologies Inc.**  
Hackensack, N.J., and Washington

# University's Data Traffic Unsnarled

Texas A&M's XML-based service cuts development time in half and supports real-time transactions. By Julia King

**P**ICTURE A TEAM of subcontractors at work on a new structure, with each worker needing up-to-date building directions to complete his task. A typical scene, but add this twist: What if the workers spoke different languages, making it impossible for them to understand the same lists of materials and schedules?

Texas A&M University in College Station faced a similar conundrum: It needed to share a wealth of information about students, budgets and payroll — all housed in a legacy Adabas system on a central IBM 390 — with dozens of disparate systems scattered across the university's academic and administrative departments.

"What we had been doing is sharing this information by dumping it into text files and then FTP-ing them all over campus," says Timothy Chester, senior IT manager for the school's computing and information systems division.

For example, files containing student names, their dormitory locations and their class schedules would be electronically transferred to all of the departments that needed the data in their own applications. It worked, Chester says, but as soon as one student swapped classes or changed residence, which happens frequently on a campus of 44,000 students, the files were rendered inaccurate.

## How the Technology Works

The answer was to develop a set of XML-based services that take vital information stored on the mainframe, such as current class schedules and students' billing information, and make it available to any and all other com-

puting platforms via the Web.

This was accomplished using Entire X, a set of XML integration tools from Darmstadt, Germany-based Software AG. The tools, which act as data translators, enable software developers at the university to work in a variety of programming languages and incorporate existing code into new Web-accessible applications.

The biggest benefit so far is a 50% reduction in system development time, Chester says. "We wanted to go with XML-based services primarily because they're platform- and programming-neutral," he says. "You get all of the benefits of that, plus you can also support real-time transactions."

One of the first XML-based applications Chester's group developed enables students to register for classes

via the Web. It's faster and more accurate than registration through an aging legacy touch-tone telephone system with just 120 lines, says registrar Donald D. Carter.

Chester's team developed a series of scripts and stored them on a Web server. Whenever a student wants to search a class schedule, a request in XML format is executed against the mainframe. The response information is also sent back in XML and is then merged with a style sheet so it can be read via the Web application.

"Entire X sits in the middle, like a traffic cop, accepting incoming messages and routing them where they need to go," Chester says. "We chose it because it supports all of our programming, including Microsoft, Java, tools from HP and Sun, and Linux, too."

Corporations can learn a thing or two from the Texas A&M implementation.

"You can have a successful system that leverages existing applications, even if those applications are long in the tooth," says Uttam Narsu, an analyst at Giga Information Group Inc. in Cambridge, Mass.

"If what you really need is not new

applications but to evoke greater access to those applications, XML and Web services is a viable way to do that," he says.

## What's Next

After about a year of development, Texas A&M's new Web-based registration system was activated on Nov. 5, 2001, and students used it to sign up for spring classes. Carter says the system cost about \$1 million to implement. Since then, it has supported about 3,000 sessions, and students have reported that it's easy to use. So far, Chester says, the IT help desk has received fewer than a half-dozen calls about the Web-based application.

"With the Web, we have a more accurate registration, because students have the visuals right in front of them on the screen," Carter says. "They can see which sections of a class are open and know instantaneously if they can get a seat."

"I've been in this business 36 years, and when we went live with this, it was an overwhelming success," he says.

As more students move to the Web to register for classes, Carter says, the plan is to gradually reduce the number of phone lines used for that purpose, thereby significantly cutting the university's communications costs.

"By this time next year, there will be very minimal use of telephone registration," he predicts.

Meanwhile, Chester's group has more plans for similar Web-based services. "We'll use this as a pilot project for other applications, such as students getting their grades online, applying for financial aid and even receiving their award letters — all online," Chester says. ▀

**ROI**



"WE WANTED TO go with XML-based services primarily because they're platform- and programming-neutral," says Texas A&M's Timothy Chester.

## Texas A&M University

**BUSINESS:** Texas' first public institution of higher education opened on Oct. 4, 1876, as the Agricultural and Mechanical College of Texas.

**STUDENTS:** The university enrolls approximately 44,000 students studying for degrees in 10 academic colleges.

**WEB SITE:** [www.tamu.edu](http://www.tamu.edu)



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KEVIN FOGARTY

# Skimping on Java May Prove Painful

**I** MUST CONFESS to a certain intellectual perversity: a tendency, when listening to people who clearly know what they're talking about, to doubt their conclusions.

In a previous column, I contradicted Paul A. Strassmann, who has written several books dense with econometrics that show that IT provides little or no boost in productivity. I argued that it does by improving the quality, if not the speed, of corporate decision-making. Of course, that was before Enron.

I find myself now doubting the conclusions of recent reports from Illuminata and Gartner, both of which say that end users can save money by developing most Java applications as lightweight Java 2 Standard Edition servlets rather than the more substantive applications that are possible using the full Java 2 Enterprise Edition. Servlets — smallish applications with limited business logic and little back-end connectivity — do the job quite well for most corporate applications, asserts James Governor, author of the Illuminata report "Java on the Cheap."

J2EE applications take longer to build; the tool kit itself is a lot more expensive, and most applications not only don't need the extra security and other features of J2EE, but they also run just fine on beefed-up Web servers like Apache Tomcat, which is stable, available and cheap, Governor writes. All true.

But recommending that people use servlets rather than J2EE for all but the most mission-critical applications ignores one major factor in the application development equation: fear.

Vital applications within an enterprise are no longer simply the mission-critical software without which

the core business couldn't function. Now they include applications that end users believe they couldn't do their jobs without. Is e-mail mission-critical? It sure is now. Browsers? Yep. Word? You bet.

Think that even inconsequential Web apps aren't vital? Try shutting off instant messaging and you'll lose hundreds of man-hours of productivity just dealing with the complaints.

## What's Mission-Critical?

Mission-critical is what users think it is. If you build a popular, useful Java app that sits on a \$5,000 Wintel server but is "lightweight" because it doesn't launch stored procedures or remote procedure calls or connect through middleware to transaction processors, you'll get just as much grief when someone kicks out the power cord as you would if a half-million-dollar Unix box went out.

And you'll deserve it. Putting useful applications on risky platforms directly contradicts all of today's priorities in application development

— most of which involve putting useful, user-friendly front ends on software whose business logic and connections sit on safe, manageable Unix boxes in a data center, where they can be maintained without having to be rebooted every couple of days.

You don't have to overbuild every application just to keep users from whining. Some applications really are inconsequential enough to run as servlets.

But if you're building an application that seriously helps your end users do their jobs, you're selling them and yourself short by not overbuilding it enough to make it reliable, scalable and easily manageable.

## Contributing Factors

Governor doesn't agree with me. Neither does Gartner. Neither would anyone who did a rigid ROI analysis of servlets vs. J2EE. But ROI doesn't take into account the cost of users waiting for an unstable servlet, the cost of rebuilding a departmental application that's suddenly in demand throughout the organization, or the long-term cost of managing dozens of local servlets from an operations center that may or may not have the resources to deal with all of them.

There are ways to save lots of money and time doing Java development, and experts on that can tell you how. But I still can't escape the conviction that no matter how right they are, they're still missing the one nontechnical feature that can keep IT managers out of trouble: the ability to keep end users happy and productive, even if a certain amount of technical overkill is the price you have to pay to accomplish that. ■



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## SNAPSHOTS

### EAI vs. Web Services

Are you investing in Web services?



Do you buy enterprise application integration (EAI) software?



Are Web services a threat to EAI vendors?



Do you expect software to eventually be delivered as a service?



BASE: 100 CIOs  
(75 IN THE U.S., 25 IN EUROPE)

SOURCE: MERRILL LYNCH & CO.,  
NEW YORK, MARCH 2002



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Security for Web services isn't so bad — if you don't have many secrets or you're willing to spend a lot. By Robert L. Scheier

**S**ECURITY IS THE No. 1 factor keeping many IT managers from deploying Web services. But don't tell that to Matt Hird, director of IT at Superior Information Services LLC.

Hird relies on well-known, proven security protocols, such as virtual private networks (VPN) and Secure Sockets Layer (SSL), to protect bankruptcy, real estate and other public information Superior provides to its customers using Web services. Hird says the Trenton, N.J.-based information broker considered more elaborate security safeguards but decided "the business risk isn't there to justify the investment."

Many IT managers afraid to expose their Web services to the outside world until new security standards are firmly in place are deploying Web services only within their firewalls. But some IT managers are moving Web services beyond the firewall, especially to handle relatively low-risk transactions with trusted business partners.

Other Web services pioneers are very large companies that need to provide secure access to critical systems and can afford the specialized tools and skills required to secure Web services before standards-based Web security tools emerge sometime next year.

Web services refers to the use of Web-based standards such as XML; Universal Description, Discovery and Integration; and Simple Object Access Protocol to link applications running on different platforms.

Unlike previous approaches that required custom coding or expensive middleware to link individual applications, Web services aim to expose key functionality within applications (such as the ability to see the balance in your checking account or to place an order from a factory) to other applications as required when business needs change.

But this ease of integration also brings risks. When a Web service connects you to a business partner, you rely on that business partner to properly authenticate, or vouch for the identity of, users at their end of the transaction. That means an intruder who has gained access at a supplier, for example, could use that improper authentication to invade systems of the supplier's customers.

To prevent such break-ins, Web services architects must look beyond application-level security measures and create access control, authentication and encryption capabilities, which can follow queries and responses as they cross system and corporate boundaries.

*Continued on page 42*

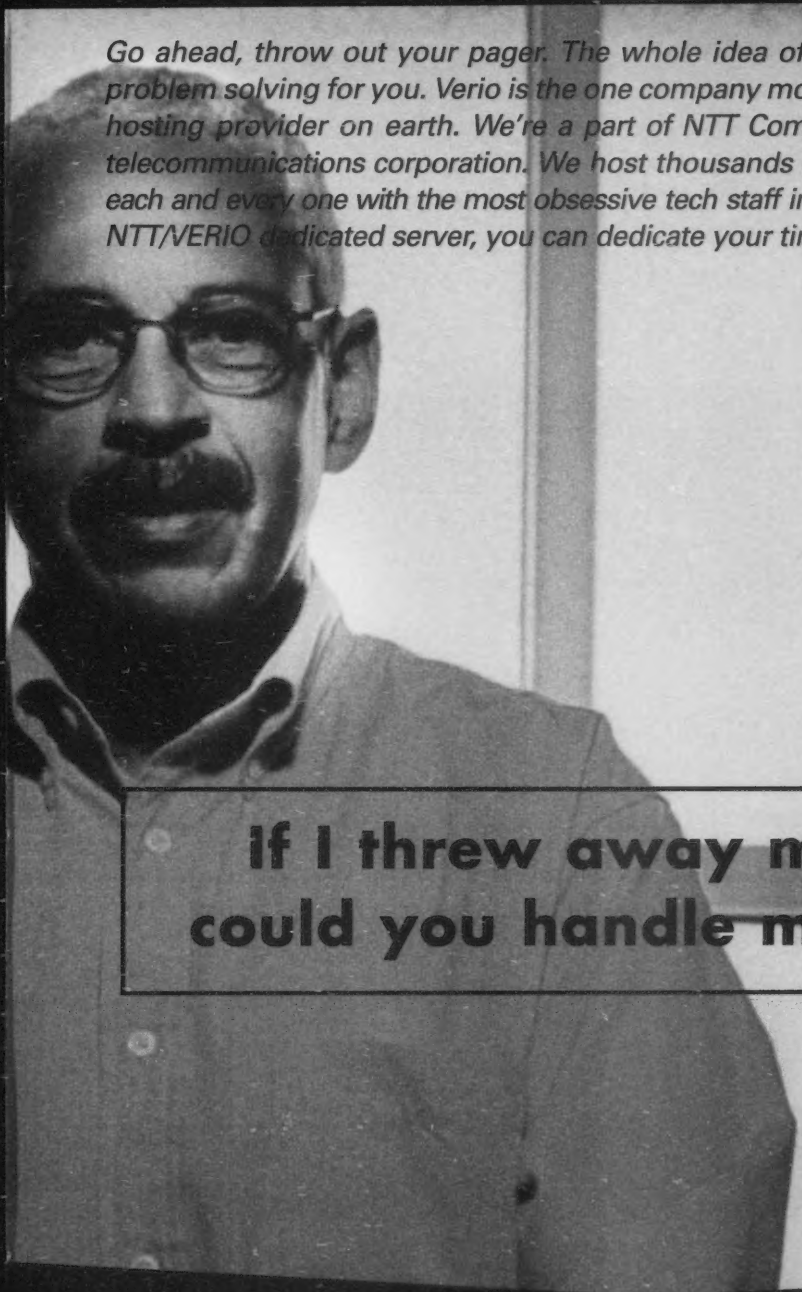


## Securing Web Services

Until more tools and standards are available for Web services security, IT managers should:

- Insist on Web services platforms that comply or will comply with key standards when they emerge.
- Do a better job securing critical parts of the existing IT infrastructure, such as servers and databases, so they're prepared for a Web services world.
- Constantly weigh the risks against the benefits of deploying external Web services with current security tools.

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**NTT/VERIO**

Continued from page 40

Web services security standards aim to do that by building security into key Web services protocols such as XML. The XML Key Management Specification will define how to register and distribute XML-based public keys to encrypt and decrypt documents, even if the sender and recipient have never done business with each other before.

The Security Assertion Markup Language will use XML to exchange information about which users have been authenticated and what data they are authorized to see.

### Risks vs. Benefits

John Pescatore, an analyst at Stamford, Conn.-based Gartner Inc., argues that such standards, along with development tools and applications, "will be immature from a security perspective" until the second half of next year. For that reason, he recommends that all but the most aggressive firms run Web services only within the firewall until then.

Others take a more flexible view. Rather than use the inside-the-firewall rule, Pete Lindstrom, an analyst at Hurwitz Group Inc. in Framingham, Mass., recommends that companies deploy Web services wherever they or trust-

ed business partners have provided enough security to the required networks, applications and databases that the business benefits outweigh the risks.

Consider Networkcar Inc., which uses a wireless transmitter in cars and trucks to send real-time location and performance information to customers such as fleet managers, dealerships and auto clubs. The San Diego-based company uses Web services based on San Jose-based BEA Systems Inc.'s WebLogic Server to share data with its customers.

It relies on the well-known SSL and the HTTP over SSL encryption protocols to protect content in transit, as well as a firewall around its database to handle authentication and authorization, says Wade Williams, a senior developer at Networkcar.

This is about the same level of security as on many conventional Web applications, which is fine, says Williams, because the data he's providing over Web services is the same the company used to provide over its intranet.

But if Networkcar were to share more sensitive data, such as customers' credit card numbers, it would have to revisit whether Web services are se-

cure enough and what other security mechanisms, such as public- and private-key encryption, to add to the mix, he says.

Superior went through a similar process in deciding that SSL and VPNs were good enough to secure the Web services it's providing using BEA's WebLogic. While a central authentication server would do a better job of keeping out unauthorized users, "the worst that can be done is that someone else could imitate" one of Superior's customers, Hird says. Superior would learn of the fraud when it billed the actual customer for the transaction and the customer refused to pay.

Even then, according to Hird, Superior would have lost only potential revenue rather than actual cash. "It's an acceptable risk because of what we're doing," he says. "If we were the CIA, that probably wouldn't be acceptable."

Hird also weighed the risks against the benefits. By using Web services, he says, Superior can develop new applications 100% faster and expand into new business areas, such as syndicating its data to business partners.

E2open LLC, a global collaboration network formed by global electronics giants such as IBM, Matsushita Elec-

tric Corporation of America, Lucent Technologies Inc. and Nortel Networks Ltd., is one of the advanced companies that both needs and can afford secure Web services today.

E2open handles and even stores trade secrets such as new product designs for its customers, so "security is No. 1," says Greg Clark, chief technology officer at the Belmont, Calif.-based organization. But without Web services, he says, the cost to integrate applications for its founders "was way too high."

To keep those Web services secure, the consortium is using Austin, Texas-based Tivoli Systems Inc.'s Access Manager (formerly Tivoli Policy Director) to store the access control rules for users, Clark says. Access Manager also provides a single sign-on capability, which allows an E2open user to sign on once and access the appropriate information through different applications at multiple E2open companies.

### Using the Right Tools

Clark acknowledges that a tool such as Tivoli Policy Director is appropriate today only for organizations where the need to integrate business partners justifies the current cost of securing Web services. Other leading players in the Web services security market include Netegrity Inc. in Waltham, Mass., Novell Inc., Entrust Inc. in Dallas, and Oblix Inc. in Cupertino, Calif.

Major vendors promoting Web services are also banding together to form Web services security standards. Last month, Microsoft Corp., IBM and Mountain View, Calif.-based VeriSign Inc. announced that they will create a new standard for Web services security called WS-Security. But a Microsoft spokesman says it will take 12 to 18 months to complete all the specifications called for by the standard.

Until more standards-based security tools hit the market, IT managers should weigh the risks of deploying Web services against the benefits. "To the extent you have a controlled environment across the firewall, then go for it," says Lindstrom, "as long as you're constantly evaluating and re-evaluating the risks." ▀

Scheier is a freelance writer in Boylston, Mass. He can be reached at [rscheier@charter.net](mailto:rscheier@charter.net).

### TOP VENDOR STRATEGIES

Find out how Microsoft, IBM, BEA and Sun plan to bolster the security of Web services.

QuickLink: 29013  
[www.computerworld.com](http://www.computerworld.com)

“[Deploying Web services is] an acceptable risk because of what we’re doing. If we were the CIA, that probably wouldn’t be acceptable.”

MATT HIRD, DIRECTOR OF IT,  
SUPERIOR INFORMATION SERVICES



MICHAEL BRANCOM

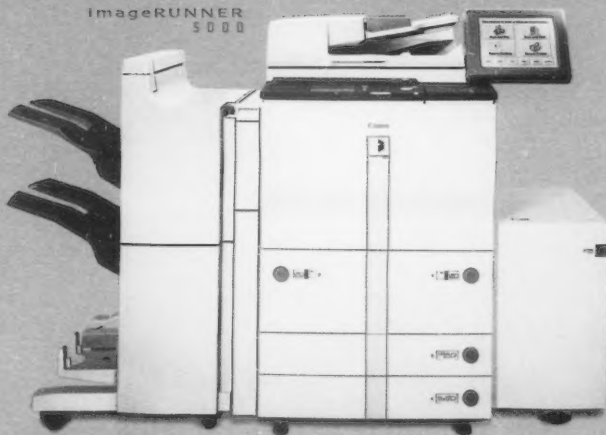


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**Canon** KNOW HOW™

These brave users are trying to integrate legacy systems that were never meant to integrate with anything. By Michael Meehan

**E**ARLY enterprise application integration (EAI) mostly involved gluing together various vendors' applications. The EAI vendor sent you an adapter for your enterprise resource planning module and your e-commerce application and voilà! They began sharing data.

Now users are looking to take a leap into the scary world of integrating homegrown applications and systems that have one foot in the tar pits. No vendor builds out-of-the-box products to do this, meaning users will be responsible for much of the work.

"You've got to make sure you pick a vendor who will work with you, because chances are that you're attempting something they've never done before," says John Stroker, director of information and planning at Palace Resorts Inc. in Miami. "At least nothing exactly like it."

What users are finding is that such work can be done, but it requires patience and careful planning. The companies profiled here and on page 46 are tackling what might be considered next-generation EAI. ▶

#### ADDITIONAL RESOURCES

For more information on EAI, visit the following Web sites:

- ❶ [www.eaijournal.com](http://www.eaijournal.com)
- ❷ <http://eai.ittoolbox.com>
- ❸ <http://eai.ebizq.net/>
- ❹ [www.metagroup.com/metaview/mv0145/mv0145.html](http://www.metagroup.com/metaview/mv0145/mv0145.html)

PEP MONTESERAT



## Brainpower Required

Motorola Inc. Chief Technical Officer Toby Redshaw puts "smart people to do the work" at the top of his integration checklist.

Motorola has a huge EAI implementation base. "We've got somewhere in the low four digits of adapters and connectors set up," Redshaw says. "We can make what I call the eight-minute egg. It takes us eight minutes to create the adapter/connector in most cases, and it takes a good staff to do it."

Yet some eggs take longer to cook, and that's when it pays to have a few master chefs on the premises.

Much of the order-entry information for Motorola's pager manufacturing unit was written using software from now-defunct FourGen Software Inc. and housed on an Informix database. Motorola wanted to integrate that data with its Java-coded Unit Personality Data warehouse, which contains the passwords and permissions for the company's employees.

IT staffers had used Java Native Interface for the personality data warehouse, which would allow it to interoperate with applications coded in C, C++ or assembly language.

"Unfortunately, FourGen objects don't act like C objects," says Motorola IT

architect Seshu Duvvapu. And Motorola's EAI vendor, Fairfax, Va.-based webMethods Inc., didn't have an out-of-the-box adapter for the FourGen objects.

The only way Duvvapu was going to get the job done was to find different code. The FourGen applications were running Hewlett-Packard Co. Unix servers, so Duvvapu decided to compile the FourGen code using Unix Object Code.

Once he did that, he linked it to the webMethods integration broker and tied in the paging business systems with the rest of Motorola's IT infrastructure.

"For years, the FourGen system was a complete silo," Duvvapu says. The project took two months to

complete because Duvvapu had to make sure the FourGen applications shared the correct information with other applications. "But once you get it to the integration layer, it's fairly easy," he says.

EAI manager Charles Soto says the adapters and connectors shuttling between Motorola's applications have changed the way the IT organization works.

"Now we're talking more about consolidation and integration instead of having to turn the world upside down," he says. "It saves a lot of time and money if you don't have to rebuild everything."

**Motorola Inc.**  
Schaumburg, Ill.

More profiles on page 46

# Extreme Integration

**Rational**  
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Developer productivity ↑ 300%

ROI ↑ 1400%

Testing time ↓ 95%

Development cycle ↓ 66%

Lump in throat ↓ 100%



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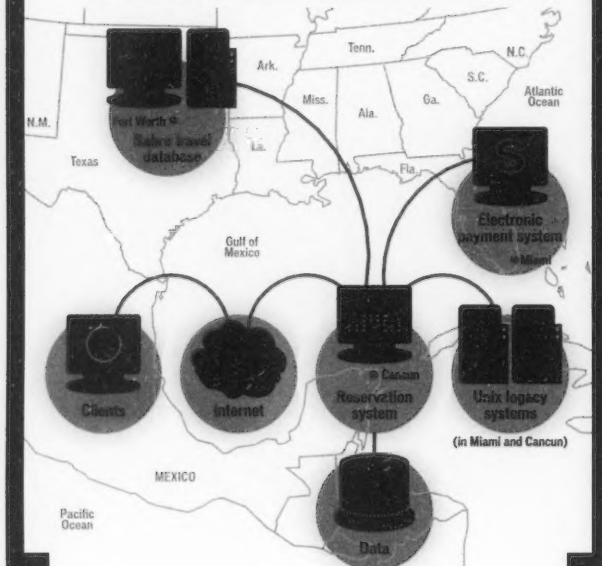
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Continued from page 44

## Going the Distance

Miami-based Palace Resorts connected legacy systems and a Sabre database in Fort Worth to a new Web-accessible reservation system in Cancun.



## Crossing Boundaries

When Palace Resorts wrote its initial hotel booking and yield management applications in 1985, Web access wasn't on the priority list. The company wrote the applications for its eight hotels in Cancun, Mexico, using Miami-based Data Access Corp.'s DataFlex Unix programming language.

But Web access was essential in 2001 when the hotelier wanted to create hotel and airfare travel packages for its guests. That meant unlocking the Unix-based information at three locations in Cancun and a central server farm in Miami. In addition, Palace needed to link to Fort Worth, Texas-based Sabre Inc.'s global travel distribution database to find airfares.

"We not only had to coordinate all these applications in real time, but we had to do it over distance," says John Stroker, director of information and planning at Palace Resorts.

He also didn't have millions of bucks to throw at the project, he adds.

"If we had to go back and look at changing our legacy systems, it would have driven the cost way out of sight," he says. "The reality of our business is that it relies on

handwritten applications, and we need to find ways of extending those applications."

Stroker chose an update of the old screen-scraper. Using the OnWeb product from Cupertino, Calif.-based NetManage Inc., Palace reached into its Compaq Computer Corp. ProLiant servers, grabbed the appropriate room-availability, pricing and customer loyalty numbers and then converted them into HTML Web pages.

"Once you get the information to your

Web server, you're fine," Stroker says. "Then it's just a matter of writing rules and presenting it."

He underscores that real-time data is the trick. "We can't afford to create [resort] packages with bad or dated information," Stroker says. "That's asking for trouble."

The system even determines whether the customer is a tour operator and then selects the appropriate Cancun- or Miami-based legacy server from which to draw the information.

The project took nine months to complete, and the new Web-booking system went live in October last year. Stroker says he expects to see a return on the project's \$900,000 investment within 18 months.

✓ Palace Resorts Inc.  
Miami

## Back to the Future

### Take the following ingredients:

- A 15-year-old IBM 3090 mainframe housing a Siebel Systems Inc. customer information system.

- A 7-year-old Sybase Inc. database for sales orders.

- An Oracle8i order-entry system for the call center, with a Web interface built on Microsoft Active Server Pages.

### Instructions:

- Fuse into a single ordering and customer information system that can also be extended to cover distributor sales.

That's the project that faced telecommunications provider Cable & Wireless USA Inc.'s IT department. To add to the complication, "the people who developed

those legacy systems are no longer here," says T. Minh Tran, senior IT director.

Ultimately, the job required multiple data transformations and the ability to process hundreds of data requests almost instantaneously.

Using the EAI broker from webMethods Inc., the Cable & Wireless IT team figured out a way to work with two parallel back ends at once. The first step was to build a Java-based order-entry form that mirrored the mainframe order-entry form.

The next step was to get the information to the EAI layer. Brad Allen, a senior systems analyst, says the team built a Dynamic Link Library (DLL) in Component Object Model (COM) so the front end could speak with the webMethods transformation engine.

"But you can't expose a DLL to Java," he says.

So embedded within the COM objects was a webMethods client that provided hooks to Java application program interfaces.

Then came the tricky part. Once a data packet hits the central order-processing servers, the system needs to determine where to send that packet.

Information headed to the mainframe needs to be retranslated for socket-based messaging while other databases process Java Developer Byte Code.

"The broker has nodes that transmit to other brokers," says IT scientist David Green. "The idea is to push through the proper information using your legacy procedure, but to separate out the complexity of your legacy procedure for the people using the system."

Green describes the webMethods layer as a shield that protects those using the Web pages from the peculiarities of the legacy system.

Yet nothing shields the IT department. Green notes that integration projects create tons of traffic behind the firewall. "A simple order will generate

about 100 transactions," he says. "A larger order can generate upwards of a thousand."

That creates the need to monitor everything in the IT architecture. A webMethods event tracker can be used to follow event traffic on various servers, but that doesn't cover network traffic or the I/O capability of the mainframe. "We've just built it, and we're really still learning how to monitor the system," Green says. "You can imagine the complexity of what's going on when something goes wrong."

Yet Tran says that such integration projects are the only way his team can justify the expense of adding new applications to Cable & Wireless' business.

"We can't afford to build systems that don't work with our legacy [systems] anymore," he says. "There are a lot of revenue-generating systems that we still have, and we need to figure out ways to keep using them."

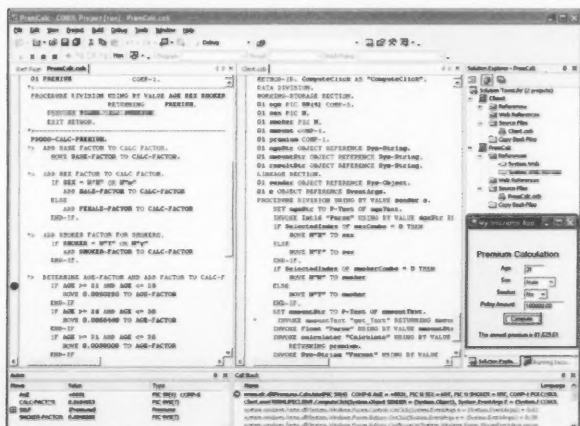
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**FUJITSU**

THE POSSIBILITIES ARE INFINITE

**W**HILE TECHNOLOGY can change quickly, getting your people to change takes a great deal longer. That's why the people-intensive job of developing software has had essentially the same problems for over 40 years. It's also why, unless you do something, the situation won't improve by itself.

In fact, current trends suggest that your business will become even more dependent upon ever-more-complex software. This means that more of your people will work on software and that their work will be harder to track and more difficult to manage. Unless you make some changes in the way your software work is done, your current problems will likely get much worse.

The quality of software, its usability, and its timely development are critical to just about everything businesses do. The speed with which your people develop software can put you ahead of or behind your competitors. Software problems may have been frustrating in the past, but mismanaged software can now be fatal to a business. If your people don't produce quality software, testing times will be excessive, schedules will slip, customers will be unhappy, and revenue will drop.

To manage a software-intensive business, you must observe three manage-

ment principles:

**1. Recognize that you're in the software business.** A senior vice president at Citibank once told me "we are a software business masquerading as a bank." It follows, then, that if you can't manage software, you'll have trouble managing your business. For example, delays in a software schedule can delay the delivery of new products and thus affect cost, revenue and profit.

**2. Quality must be the top priority.** In software work, quality problems overwhelm everything else. When quality isn't managed, entire software projects are unmanageable.

There are ways to manage software quality, but they require proper training and disciplined software-engineering methods.

**3. Quality software is developed by disciplined and motivated people.** Software development is intellectual work, and undisciplined or unmotivated people can't do timely or predictable work.

In deciding how to manage software quality, consider these facts. First, while developing programs, even experienced software engineers inject one defect in about every 10 lines of code. The programmers aren't incompetent or lazy — they're just human. All humans make mistakes, but in software, these mistakes result in defects. This means that a modest-size program of 100,000 lines of code typically would start with about 10,000 defects.

The second key fact about software quality is that the cost of finding and fixing defects increases at every step in the development process. For example, Xerox Corp. measured the time it

takes to find and fix a defect at each stage:

- **Code reviews**, in which programmers analyze their own programs: three minutes.

- **Code inspections**, in which several programmers look for problems: 25 minutes.

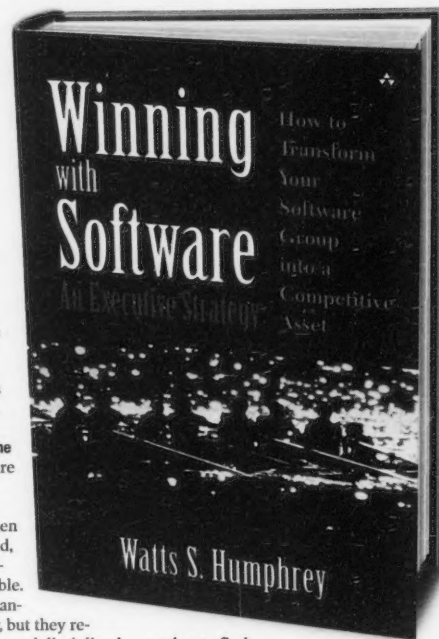
- **Module testing**, in which programmers test small program modules: 32 minutes.

- **System testing**, in which the modules are combined so the whole system is tested: 1,400 minutes.

To appreciate the significance of these times, consider the time required to find and fix 10,000 defects. Using the Xerox data, the defect-removal time would be 500 hours for code reviews, 4,170 hours for inspections, 5,330 hours for module testing and 234,000 hours for system testing. Note that 234,000 hours is over 100 engi-

*Continued on page 50*

#### BOOK EXCERPT



A software guru's message to executives: Your application development group can be a competitive asset — or a business disaster. By Watts S. Humphrey

# Why Quality Pays



## Cutting, squeezing and overhauling

budgets have always been the toughest part of your job. But you now find those skills being tested like never before when challenged to reduce infrastructure costs without risking your long-term business objectives.

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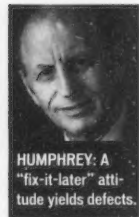


## Why Quality Pays

Continued from page 48

neering-years of work. Clearly, selecting the proper defect-removal method makes a big difference in both software development time and costs.

The third key fact about software quality is that the person who developed the program is the one best able to find and fix its defects. This review takes about an hour for every 100 lines of code. Programmers who do careful reviews typically find and fix five to 10 defects per hour. Therefore, counting review time, the average defect-removal time in code reviews is six to 12 minutes per defect. With code reviews, the engineers can find and fix 10,000 defects in about 1,000 hours instead of about 4,000 hours with inspections, 5,000 hours with module testing or over 200,000 hours in system testing.



**HUMPHREY: A "fix-it-later" attitude yields defects.**

The reason testing takes so long is that a test reveals only the symptoms of a problem. Then the engineers must determine where the problem is in

the system and its underlying cause. This is particularly difficult when there are multiple problems. Then the engineer must isolate the symptoms for each problem, identify the troublesome module, find the mistake and then fix it. After each defect is fixed, the fix must be installed in the system and the system retested. Because each of these steps can take an engineer an hour to a week or more, the time to find and fix a few hundred defects can be many months. This makes it hard to predict how long a project will take.

Not only does system testing take longer; it still produces software with lots of defects. The inspection strategy takes half the time and leaves less than half as many defects, while the review strategy takes a quarter of the time and leaves one-eighth as many defects.

Since code reviews by programmers are so effective, you might wonder why everyone doesn't use them. The reason is that good code reviews require disciplined methods and special training. The programmers must gather defect

## Why Projects Fail

Two questions have often bothered me about software work. **First, why do competent software professionals agree to completion dates when they have no idea how to meet them? Second, why do rational executives accept schedule commitments when the engineers offer no evidence that they can meet those commitments?** Where software is concerned, many otherwise hardheaded executives willingly accept vague promises and incomplete plans. Management's undisciplined approach to schedule commitments contributes to every one of the five most common causes of project failure:

1

### UNREALISTIC SCHEDULES

You might think that pushing for an aggressive schedule would accelerate the work, but it actually delays it. When faced with an unrealistic schedule, engineering teams often behave irrationally. They race through the requirements, produce a superficial design and rush into coding. This mad scramble to build something — anything — results in a poor-quality product that has the wrong functions, is seriously defective and is late.

2

### INAPPROPRIATE STAFFING

The only way to complete an engineering project rapidly and efficiently is to assign an adequate number of people and then protect them from interruptions and distractions. This helps build the motivation and effective teamwork needed for quality results. When managers fail to provide timely, adequate and properly trained resources, their projects will generally fail.

3

### CHANGING REQUIREMENTS DURING DEVELOPMENT

To start designing and building products, engineers must know what product to build. Unfortunately, management, marketing and even customers often don't know what they want. Worse, they think they know and then change their minds partway through the job. While the requirements (or objectives) normally change in the early phases of a job, there's a point beyond which changes will waste time and money and disrupt the work.

4

### POOR-QUALITY WORK

Consider the case of Greg, manager of a manufacturing software project that had to meet an accelerated delivery date set by his boss. Greg unmercifully pushed his engineers, who rushed through the design and coding and skipped all of the quality reviews and inspections. Testing found many defects, but Greg argued for delivering the software and fixing defects later. Greg met the deadline, but the system was a disaster. It was so unreliable that the software had to be fixed every time a change was made in the product or product mix. Excessive factory downtime and repairs cost the company over \$1 million. When executives push for unrealistic schedules, the project either will be late in delivering a working product or will produce a product that doesn't work. There's a saying about software quality: "If it doesn't have to work, we can build it really fast."

5

### BELIEVING IN MAGIC

Commercial off-the-shelf software, or COTS, is an attractive way to save development time and money. But COTS isn't a silver bullet. If not properly managed, it can be a disaster. A COTS product that works perfectly in demonstrations, for example, may crash when subjected to different hardware configurations, higher data rates or even data-entry errors. You must test the product thoroughly enough to expose previously untested conditions. If the program is troublesome when stress-tested, it will almost certainly be troublesome when used in production.

— Watts S. Humphrey

data and use the data to help them find and fix the defects. Because people tend to make the same mistakes repetitively, the data shows programmers what kinds of defects to look for. With few exceptions, programmers aren't trained in such quality methods and don't believe that reviews and defect data would help them.

Why not? It's because of the way they've been trained and managed. Starting with their first programming courses, they learn that the most admired programmers produce code at lightning speed and fix defects in testing. This fix-it-later attitude fosters poor practices. To get quality work, you must change this culture.

Fortunately, there are techniques for changing the culture and managing software projects. I developed two methodologies for the Software Engineering Institute:

- **Personal Software Process**, which replaces code-and-fix methods with a disciplined process that helps individual programmers learn about the quality of their work — without slowing them down.

- **Team Software Process (TSP)**, which builds motivated teams of programmers who track and manage the quality of their work and who are rewarded for doing quality work.

Companies that have adopted these methods dramatically reduce testing time and produce what is essentially defect-free software — on schedule or ahead of schedule — while reducing employee turnover. It takes about two years for the benefits to exceed the cost of implementation (mostly the cost of training).

When Boston-based Teradyne Inc. adopted the TSP, for example, its previous rate of 20 defects per thousand lines of code was reduced to one defect, and the company saved \$5.3 million in the first two years. As a Teradyne manager once told me, "With the TSP, we're so far ahead of the competition that nobody will ever catch us." ▶

*Humphrey is a fellow at the Software Engineering Institute at Carnegie Mellon University, where he led the Capability Maturity Model effort and other work to improve software development. This article is adapted, with permission, from *Winning With Software: An Executive Strategy* (Addison-Wesley, 2002).*

### ADDITIONAL RESOURCES

A description of the Personal Software Process:  
[www.sei.cmu.edu/tsp/tsp.html](http://www.sei.cmu.edu/tsp/tsp.html)

An overview of the Team Software Process:  
[www.sei.cmu.edu/tsp/tsp.html](http://www.sei.cmu.edu/tsp/tsp.html)





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1-866-2REDHAT #4

# Hot Java!

What you need to know to land a job and keep your skills fresh in the Java development field. By Steve Ulfelder

## Employee Spotlight

### Name: HERB BERGER

**Title:** Advanced technology group manager

**Employer:** Limited Technology Services Inc., the IT arm of retailer The Limited Inc. in Columbus, Ohio

**Current IT staff:** About 750

**Now seeking:** The Limited has openings for about a half-dozen Java programmer/analysts and senior programmer/analysts. "Java has become much more mainstream [in] the past two years," Berger says. "It's almost easier to find Java people than C++ people now."

**Reason:** In the past two years, The Limited has consolidated operations and created Limited Technology Services. "We had to identify core technologies so we could get more reuse, and Java and J2EE [Java 2 Enterprise Edition] certainly qualify," Berger says. The centralized IT organization has a 40-member internal Java user group that

makes decisions about how and when to publish objects for reuse, for example.

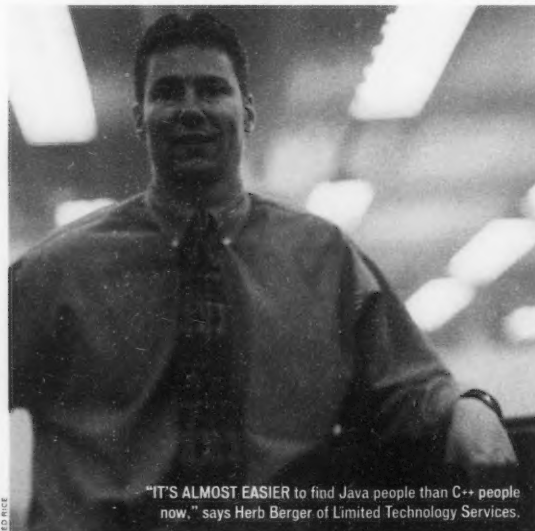
The Limited has two hot Java projects right now. First, the company is changing e-commerce platforms for its Victoria's Secret Web site, one of the world's busiest

### CAREERS

e-commerce sites. The site was built using IBM's Net.Commerce platform; The Limited recently evaluated a revamped version of Net.Commerce, as well as BEA Systems Inc.'s suite. (San Jose-based BEA got the nod.) The changeover is keeping many staffers busy.

In addition, the retailer has launched a project known internally as the Integrated Brand Delivery Initiative. This ambitious program, which uses Java underpinnings, combines an upgrade of in-store register systems with new performance and scheduling tools.

—Ulfelder is a freelance writer in Southboro, Mass. Contact him at [sulfelder@yahoo.com](mailto:sulfelder@yahoo.com).



"IT'S ALMOST EASIER to find Java people than C++ people now," says Herb Berger of Limited Technology Services.

## Is It Hot?

**MARKET:** A 2001 survey by Palo Alto, Calif.-based Devx.com Inc. found that U.S. Java developers earn an average of \$83,000, making them some of the highest-paid specialists in IT. Pay in the Northeast was highest, at \$103,561. Southern California was next at \$93,875.

**DEMAND:** "Yes, there is a market now [for Java experts]," says Kevin Rosenberg, managing director at Bridgegate LLC, a technology search firm in Irvine, Calif. "But before that happened, developers needed to shed the attitude of 'the world needs me.' As soon as developers became pragmatic about their value, the market started to stir."

## Best Place

■ An investment management company that offers mutual funds and other financial products and services to individual and institutional investors.

■ Ranked No. 82 on *Computerworld's* 2002 Best Places to Work in IT list.

**The Vanguard Group Inc.**  
Valley Forge, Pa.  
<http://flagship.vanguard.com>

**2001 revenue:** Vanguard is privately held, with more than \$580 billion under management in its 106 U.S. funds.

**Number of IT workers:** 2,700; 700 to 800 are involved in Java programming.

**How it hones staff skills:** "To recruit and retain great Java engineers, you need competitive compensation," says Jeff Dowds, principal of direct investor systems at Vanguard. "We pay our crew well."

Vanguard also offers (and pays for) comprehensive training—about 20 courses in XML, HTML, JavaScript, Perl and other Java-related technologies.

Dowds says Vanguard's best retention tool is its commitment to advanced technologies. "If you want to attract the best people, you need to be working with the tools that appeal to them," he says. "We exploit browsers and application servers, and we're heavily object-oriented—for anyone in the IT business, that's what they want to work on."

## JAVA CERTIFICATION DEBATE

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[www.computerworld.com](http://www.computerworld.com)

## Skills

- Get "deep development" Java skills. Employers prize experience with Enterprise JavaBeans (EJB), servlets and business-logic modules. But remember, not all hiring managers consider EJB and J2EE experience a prerequisite.
- Make your résumé stand out with some knowledge of Unified Modeling Language, the standard notation in object-oriented design methodology.
- Learn Simple Object Access Protocol (SOAP) and Web Services Description Language (WSDL), which are key Web services underpinnings, to be well positioned for the expected surge of Web services. Another technology to know is XML Schema, or XSD, which is at the core of SOAP, WSDL and Uniform Description, Discovery and Integration.
- **Bonus tip:** Add server-side Java skills and business experience to deep development skills.

## Training

- IT professionals have myriad Java training options, from tutorials to "code camps" to Sun Microsystems Inc.'s Java University. Certification and education companies such as Learning Tree International Inc. in Los Angeles offer a wide variety of Java programs, as do universities with strong IT programs.
- There are hundreds of Java certification options. Recruiters say Sun's offerings carry the most weight, but any certification may help; only about 25% of Java developers are certified.
- **Bonus pay?** Before you spend \$300 to \$3,000 for training, be advised that some training experts say certifications can help boost your salary 35% or more, but other recruiters say Java certifications mean little to them.

## Salaries

- A few current full-time job postings include Java developer with experience in J2EE, servlets and EJB, \$65,000 salary, Nashville; and Java Swing developer to work with database specialists at a large financial institution, \$80,000 to \$85,000 salary, Chicago.
- **Hot markets:** New York, with its concentration of financial services firms, is a hot spot for Java developers. Another market to watch is Boston, a biotechnology and biopharmaceuticals hub.

SOURCES: SUN MICROSYSTEMS; THE PRESIDENT OF NEW ENGLAND OPERATIONS AT NEW YORK-BASED RECRUITING FIRM PENCOR SYSTEMS INC.; SUN MICROSYSTEMS; THE PRESIDENT OF NEW ENGLAND OPERATIONS AT NEW YORK-BASED RECRUITING FIRM PENCOR SYSTEMS INC.; SUN MICROSYSTEMS; THE PRESIDENT OF NEW ENGLAND OPERATIONS AT NEW YORK-BASED RECRUITING FIRM PENCOR SYSTEMS INC.; SUN MICROSYSTEMS; THE PRESIDENT OF NEW ENGLAND OPERATIONS AT NEW YORK-BASED RECRUITING FIRM PENCOR SYSTEMS INC.

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*As president of QUALCOMM's Wireless & Internet Group, Dr. Paul Jacobs has a unique perspective on third-generation (3G) networks, devices and applications. How will 3G drive new advances in enterprise mobility?*



wireless knowledge

NICHOLAS PETRELEY

# Development On the Qt

**T**HE INTRODUCTION of Microsoft Visual Studio .Net drew a lot of attention to issues like whether C# is preferable to Java and how the .Net framework compares with the Java 2 Enterprise Edition framework.

My recommendation is to go with Java and J2EE, in part because they're maturing so quickly, but mostly because they don't tie you to Windows as a development platform.

But with all this fuss being made about C# vs. Java and the competing frameworks, it's easy to forget that there are many other options for application development. My favorite is Qt, from Trolltech AS. The latest version of Qt, Version 3.0, is the foundation for the phenomenal K Desktop Environment (KDE). I'm crazy about KDE 3.0, so it should come as no surprise that I'm equally enamored with Qt.

Qt is a set of C++ libraries and visual development tools. It's available for Windows, Mac OS and just about every flavor of Unix — including Linux — and many handheld devices, such as the Sharp Zaurus. The Qt application programming interface (API) is virtually identical for all desktop platforms, so you can create a single source-code base and should be able to compile it without modification for all the supported operating systems.

The latest version of Qt includes support for SQL access to databases via plug-ins that support Open Database Connectivity, Oracle, Sybase, MySQL and PostgreSQL. It has a broad range of XML objects and functions and supports OpenGL 3-D graphics, customizable graphical user interface themes, layout managers to help an application look its

best on any platform and more.

Trolltech is also working on a project that will allow you to add a JavaScript-like language for your Qt applications. This will give your Qt-based applications scripting facilities, much like today's productivity applications support various forms of Basic scripts, such as Visual Basic for Applications.

The Qt API has expanded so dramatically during the past couple of years that one might get the impression that it's getting too bloated to be useful. But you can get the source code to Qt, and the configuration step for compiling your own Qt libraries makes it very easy to eliminate the features you don't need, so you can trim Qt down to nearly any size you want.

The handheld support is especially fascinating. Trolltech offers a complete handheld desktop environment called Qtopia. Qtopia includes Java support and comes with dozens of applications, including a full range of personal information management programs like those you get with a Palm device.

All of the aforementioned software is open-source and free, as long as you distribute your applications according to the requirements of

the GNU General Public License. (You must also make your source code available.) If you want to sell proprietary applications based on Qt, you have to pay license fees to Trolltech. The license fees seem a little steep at more than \$3,000 per developer for the enterprise edition of Qt, but it's well worth it.

Some programmers balk at using Qt because it relies on C++ instead of C. Personally, I suspect that many of them claim the problem is with C++ but that their real reluctance lies in their inability to conceptualize object-oriented programming techniques. That's not to say that C++ is an ideal language. Java was designed to eliminate many of the weaknesses in C++, and it does that job very well. But there's still room for C++ in your arsenal of languages.

The other objection to C++ is that it's slower than C. But let's face it — we gave up some speed when we graduated from assembler to C many years ago. I don't see why we can't give up a bit more speed to gain the advantages of C++ and tools like Qt. Certainly, if you're considering Java or C#, you've already decided that

raw speed isn't the determining factor in your choice of language.

Java boasts the best degree of platform neutrality. C# could eventually give Java and C++ with Qt some serious competition, if anyone successfully ports the .Net framework to other platforms. But if you want to use the lean, mean C++ to build applications that will have the widest audience, I don't see how you can beat the combination of C++ and Qt. ■



## SNAPSHOTS

### Barriers to Web Services

Programmers say that the following are the biggest barriers to developing applications for Web services:

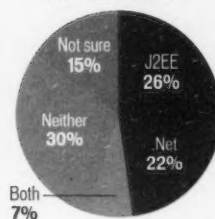
- 1 Ambiguous or missing standards
- 2 Lack of end-to-end security
- 3 Uncertainty about how to build Web services application architectures
- 4 Establishing trust among e-business partners

BASE: 813 SOFTWARE DEVELOPERS IN NORTH AMERICA

SOURCE: EVANS DATA CORP., SANTA CRUZ, CALIF., MARCH 2002

### J2EE vs. .Net

Is your company more likely to commit to J2EE or .Net as its Web services foundation?



Both 7%

BASE: 100 CIOs (75 IN THE U.S., 25 IN EUROPE)

SOURCE: MERRILL LYNCH & CO., NEW YORK, MARCH 2002

### Three Phases

Adoption of Web services is expected to follow this timetable:

#### 2002-03

Within the firewall

**BENEFITS:** Simplified application integration; increased developer productivity

#### 2003-05

Controlled set of external users

**BENEFITS:** Simplified business partner connectivity; richer application functionality; subscription-based services

#### 2005-08

Fully dynamic search and use

**BENEFITS:** Casual or ad hoc use of services; new business models possible; commoditization of software

SOURCE: IDC, FRAMINGHAM, MASS., FEBRUARY 2002



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### Senior Software Engineer

Ft. Collins, CO

Requires in-depth knowledge of internet-based messaging protocols, Java Messaging Specification and Java / C-based embedded systems. Also requires hands-on experience with commercial JMS-based products, J2EE, Solaris and Linux environments and development of software to control electrical power equipment. Must have MS Computer Science or equivalent education and experience. Travel required.

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Software Engineers- Research, design, test, and implement software systems in a client/server and IBM mainframe environment for clients; analyze requirements, evaluate applications, formulate design approach, develop software, and fix technical problems. Use IBM ES 9000, MVS/ESA, VSAM, DB2, CICS, JCL, Cobol, QMF, Xpediter, ENDDVOIR, Visual Basic, Access, HTML, Oracle, APS, REXX, SPURF, and LAN based DOS Foxpro. Require Master of equivalent foreign degree in Computer Science, Computer Engineering, or System Management and 1-year experience in the related occupation as a Programmer Analyst or Mainframe Consultant. Must have 1-year experience in design of software system in a client/server and IBM mainframe environment, and use of APS, Endrivo, MVS/ESA, QMF, and SPURF. \$71,292.50/yr. 40 hrs/wk, 8a-5p, M-F. Work location: Various unanticipated locations throughout the U.S. Send resume to Colorado Department of Labor and Employment, Employment Programs, ATTN: Jim Shimada, Two Park Central, Ste. 400, 1515 Arapahoe Street, Denver, CO 80202-2117, and refer to order CS0519207. An employer paid ad. Application is by resume only. Must have proof of legal authority to work in the US.

Dublin Manufacturing Co. seeking FT expd. Manager of Product Support to research, design, and developing of computer software systems, in conjunction with hardware product development. Analyze software requirements to determine feasibility of design within time and cost constraints. Consult with hardware engineers and other engineering staff to evaluate interface between hardware and software, and operational and performance requirements of overall system. Formulate and design software system, using scientific analysis and mathematical models to predict and measure outcome and consequences of design. Bachelor's degree in Computer Science, competitive salary. Fax resume to Alison (561) 995-6027.

Software Devel. Denver. Use working knowledge of IBM AS/400, Windows NT, UNIX platforms to generate error free appic & system codes to meet client specs. Document logic in software programs, maintain/enhance product module functionality & document changes, conduct unit/integration testing for functionality & limits, tech assist to program users, participate in design process & reviews, stay updated on tech reports re program developments. Min req.: BA or for equiv/Engin., math, physics, comp sci. + 1 yr as Syst. Analyst, Programmer, Software Consultant or supervisory position in same. \$52,080/yr. 40 hrs/wk. Must have proof of legal authority to work in the U.S. Apply by resume only to Colorado Department of Labor & Employment, Employment Programs, Attn: Jim Shimada, Two Park Central, Suite 400, 1515 Arapahoe St., Denver, CO 80202-2117. Refer to Job Order #C05019169.

Programmers, Jr. Programmers, Software Engineers. Design, develop, test and implement specialized software apps using data encryption technology including Amnrix, Crossworlds, Oracle RDBMS, Oracle tools and 3rd party utilities including Toad, SQL Navigator, Oracle Forms and Reports. US Workers only. Consulting positions requiring travel. Prevailing wage/benefits. Send resume to HR, Decanet Tech Corporation, 4284 Verdigris Circle, San Jose, CA 95134.

Systems Programmers/Analysts in Houston, TX needed to plan, develop, test programs using code and application profiling, load and stress testing, risk and reliability evaluation. Must have Bachelor's degree and 2 years experience in job offered. Resumes should be emailed to Systech Business Solutions at systech@systechbusiness.com. Put code ADVP3 on email.

Software Engineers. Design, develop, test and implement software using Java, J2EE, Weblog/Websphere, Distributed Technologies, Rational Rose, UML, Oracle, and SQL Server on Windows NT/2000, UNIX. Prevailing wage/benefits. Send resume to HR, Radiumsoft, 4470 Chamblee Dunwoody Rd., Suite 200, Atlanta, GA 30338. EOE.

Systems Analyst. Design/Develop business intelligence systems. Test applications & develop Oracle based reports using discoverer. Req: Bachelors in Engineering & 2 yrs. experience. 40-hr/wk. Job/Interview site: Springfield, VA. Send resume to Minda Technologies, Inc. P.O. Box 1342, Springfield, VA 22151

Interface Analyst needed to assist in the planning, coordination, testing and successful implementation of systems interfaces for an Application Service Provider. Gather functional requirements from clients and document requirements for subsequent releases of company's Software. Provide responsive and timely feedback and support to client facing teams (Sales, Client Services and Customer Care). Ideal candidate must have BS in Computer or related field and at least 1 year of related experience. Must have working knowledge of MS SQL, Visual Basic, ASP, JSP, ERWin4.5 and BPWin4.0, as well as Rational's suite of products including Rational Rose 2000b, and Rational RequisitePro. This is a full time position, from 9a.m. to 5p.m. Please fax or send resume to Shan Gerencner at (312) 456-0839, Visability, Inc., 68 E. Wacker Pl., Chicago, IL 60601.

System Engineer - OPNET Modeling - MeshNetworks, Inc. seeks candidate with 3-5 years experience in communication networks R&D and modeling communications networks with the OPNET tool. Knowledge of entire OPNET model development process and network performance analysis required. Strong research background in CoS algorithm design in distributed networks and experience in modifying radio pipeline stages in physical layer protocol modeling required. Design and modeling experience with link layer protocols including 802.11 and CSMA/CA required. Experience with the OPNET IP routing modules, ad-hoc network protocols and resource reservation protocols. Software skills should include C/C++, Proto-C, UNIX, Windows and RTOS. MS degree required, PhD preferred. Send resume to: HR, MeshNetworks, Inc., P.O. Box 948133, Maitland, Florida 32751.

Applications Programmer II. Dvp s/ware apps for back end credit card services; code prgm modifications; dvp models & simulations based on credit card back end processing data structure & finl analysis. Bach in MIS, Finance, Economics, or Acctg + 2 yrs exp, incl exp in: VB prgng; finl analysis; credit card back end processing data structure analysis; SQL server. Send resumes to Thomas Lloyd, Wells Fargo Merchant Services, 7000 Vista Dr., W. Des Moines, IA 50268.

SYSTEMS ANALYST to provide on-site consulting in analysis, design and development of business applications for manufacturing, distribution and retail industries using CASE tools on IBM AS/400; provide customization and implementation of shop floor tracking systems (MES), warehousing systems (PKMS) using RPG, RPGLE, COBOL and C and SQL, and web technology tools Java, JSP, Active Server Pages, JavaScript and VBScript. Require: B.S. in Computer Science and two years experience in the described job duties. 40% travel to client sites within the United States required. Competitive salary and benefits; 40 hrs/wk, 8 am to 5 pm, M-F. Mail resume to: Vice President, Frontline Consulting Services, Inc., 8701 Mallard Creek Road, Charlotte, NC 28262.

Physical Therapy office is looking for Oracle/Microsoft Certified Professional Database Administrator to setup local area network, design and develop databases, optimize database performance, design and implement backup and recovery strategies, perform system upgrades, install and maintain medical records and patient accounting applications, and perform system administration. B.S. Computer Science req. + 2 yrs exp. with medical applications. \$55,000.00 per year. Qualified applicants only. Send resume to Mrs. M. Baguio, 1037 NW 10th Lane, RRI Box 54, Avo, MO 65608. EOE.

Sr. Programmer/Analyst to develop applications for Energy, Banking, Healthcare & other sectors. Should have experience in PowerBuilder 7.0, Prolog 7.5, Oracle 8.1, Sybase XI, Informix 7.0, TOAD, Erwin, Power Designer, Visio & should be able to integrate Client Server applications with Palm Pilot. Experience in web applications using ASP.NET, HTML & Web PB. Applicant should have BS in Computer Science or Engg. + 5 yr. exp. + Certified PowerBuilder Developer. Salary at prev. wage rate. Apply to SkyBridge Inc., 2100 Roswell Road, Suite 200C-800, Marietta, GA 30062 with work auth. proof in US.

Several computer related positions for large telecommunications consulting services company. Send resume to: Tangelia Burks, SchlumbergerSema, 30000 Mill Creek Avenue, Suite 100, Alpharetta, GA 30022.

Systems Analysts, Bethesda, MD. Develop CGI, client/server software for biomedical applications, incl. sequence comparison & alignment algorithms, biological database development, config assembly algorithms, protein & DNA/RNA sequence analysis methods & algorithms using C/C++, PERL, SQL, HTML & Oracle or Sybase databases, relational databases, shell script languages for OS Windows NT & UNIX. Req'd. B.S.C.S. or rel. field & 2 yrs rel. exp. M-F, 40hrs/wk. Send resume to I. Sytnikov, HR, REF. # 402, InformMax, Inc., 7600 Wisconsin Avenue, 11th Floor, Bethesda, MD 20814.

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**Minimum requirements:** Bachelor's degree in computer science, information systems, or related analytic field (marketing), with three years previous experience. Three years previous experience must include database marketing, data file processing, data QC analysis, and UNIX.

**Competitive salary:** Hours: 8 am-5 pm, M-F. Must have indefinite right to work in U.S. Send resume demonstrating minimum requirements to:

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3 Riverside Drive, STE. 203  
Andover, MA 01810  
Attn: James Noonan

**COMPUTER/IBM NMS Consulting** Systems Eng'l. Framingham, MA. Identify new and existing opportunities for NMS, which requires knowledge of the engineering of complex IBM networking environments and how they can be architected and managed cost effectively. Will assist sales staff and ensure effective solutions and will provide technical training to IT staff on use of GSOC customer service portal post-implementation. **REQUIRES:** 5 yrs. exp. in job offered or 5 yrs. exp. as a Sr. Network Consultant/Systems Eng'l. Exp. which may have been obtained concurrently must include: 5 yrs. exp. with WAN, VPN, and LAN technologies & NT, UNIX and Network operating systems. Must possess experience in IBM AS400, TN3270 protocols, devices and associated host-end processors. Must possess IBM Management System, and HP OpenView and/or Cabletron Spectrum. Must be CIP Certified. Mail resumes w/ ad (no calls): D. Schofield, DData, 135 Newbury St., Framingham, MA 01701.

**Senior Software Engineer.** Develop a framework for Bluetooth/WAP enabled web applications. The framework provides basic building blocks such as Catalog Builder, User Based Content, automatic generation of UI specific to the type of device. The framework is based on open standards such as XML, WAP and Bluetooth and is built on java based technologies. Requires: B.S. in Electronics and Communications and 5 years experience in Software development. 40hrs/wk (9:00 AM to 5:00 PM). \$72,000.00/yr. Send two resumes/responses to: Job Order Number 2001-910, P.O. Box 989, Concord, NH 03302-0989.

**Programmer/Analyst (Alpharetta, GA):** Design and develop software applications using COBOL, DB2, CICS, JCL, VSAM, SQL, (J2EE) APIs like JDBC, Servlets, JSP, RMI, EJB, Req. Bachelor or its foreign degree equivalent in C.S., Engineering, or its related field plus 2 yrs. exp. in job described. Resume to: HR Manager, job code GC0566, Software Services & Resources, Inc., 3574 Old Milton Pkwy, Alpharetta, GA 30005

**Carnival Cruise Lines seeks: Programmer/Analyst.** Design, implement/support appl. systems on Unisys 2000 in a Microsoft (MS) NT network.

**Database Administrator.** Install & configure SQL database servers in MS Windows NT/2000.

**Systems Support Specialist - Analyst/Configure/support server & desktop systems in MS Windows NT.**

**Applications Analyst & Sr. A/Rsp.** for wireless solutions, state-of-the-art products/development, in MS NT environment.

**Databases Specialist - Resp.** for data modeling/Oracle databases on a Sun Solaris UNIX platform/build appl. & database components w/POWERMART tool & BRIO Query.

**Require:** B.S. or Equiv. in Computer Sc., Engineering or Math & relevant exp OR substantial relevant exp. Resumes to Beatriz Rodriguez/Recruiting Mgr/3655 NW 67 Av. Miami, FL 33178.

**Database Design Analyst-RTP.** NC Provide system requirements analysis & system database design & development in a team setting. Develop project requirements using formerly applied methodologies. Implement & support database software applications used for Data Quality Assurance analysis. Provide on-site consulting to clients, analysts, programmers & operators staff to ensure that Data Warehouse data quality meets system requirements & user needs. Conduct data retrieval to automate manual tasks requested for data quality metrics. A Bachelor's degree in Electrical Engineering, or Computer Science & 4 years experience as Database Design Analyst or Programmer are required. Experience must include 4 years developing database applications. Please send resume to Ref. (#214)-The Underwood Group, 5001 Venture Parkway, Suite 105, Cary, NC 27513, or email to Tug@underwoodgroup.com

**Mrs. Smith's Bakeries, LLC.** in Suwanee, GA, needs an EC Developer to develop, maintain, and support e-commerce software programs; design/develop interfaces w/ various systems using ABAP/4, SAP/EDI, IDOCs, SAP/Workflow, and Business Connector. Perform specialized functions using: SAP/ALE, SAP ABAP programming skills, UNIX, SAP Gentran, ITS Programming, Java, and Web Reporting. Req. Bachelor's degree in electronics communication engineering, computer science or related field plus 2 yrs of exp in the job offered OR 2 yrs exp in the area of information systems and technology focusing on SAP Integration, EC initiatives, interface/integration design, development and mapping. Resumes to: D. Quinn, Mrs. Smith's Bakeries, LLC, 2855 Rolling Pin Lane, Suwanee, GA 30024.

**Software Eng'rs:** Research, design, develop & implement web-based sw applic'n w/ C/C++, Java (EJB, JSP, Applets, Servlet, JDBC), VB, VBScript, Weblogic, ASP, SQL Server 2000, 7.0, ADO, HTML, DHTML, Dgn. Dev. fronted for applic'n w/ SQL, Oracle's & convert DB from DB2/Oracle into SQL Server-based w/ AS400/Cobol. 40hr/w, 8-5, BS in eng'g/foreign equiv'l, & 2 yr wk exp. in job/in any position involv'g AS400, Oracle Weblogic, Unix. Resume to: Sys Soft Tech of Cleanwater, Inc., 3574 Old Milton Pkwy, Alpharetta, GA 30005

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The Gillette Company is the world leader in more than a dozen consumer product categories. Global World Class operations are increasingly dependent on Information Technology. Exciting opportunities exist in global business process integration initiatives. We are currently seeking the following highly qualified professionals to join the Gillette IT team in the Boston area.

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**1 (SAP) Staff Basis Administrators-Configuration Specialists-Application Developers**

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**F/T Project Implementation Specialist.** Responsible for working with the customer to analyze and document data processing requirements and implement data programming for processing those requirements. Configures and installs applications using C/C++, COBOL, UNIX and Windows. Work background must have included exp. with the US telephone billing/medical industry. Must have a Bachelor's degree in Computer Engineering or foreign degree equivalent. Must have two year exp. Salary: Competitive. Send resume to: J. Laudenschlager, Intec Telecom Systems, 5775 Peachtree Dunwoody Rd., Bldg. G, 3rd Fl., Atlanta, GA 30342.

**Programmers, Jr. Programmers, Software Engineers** Design, develop, test and implement specialized software apps using Novena, Web Integrator, IFD, MMD, T.M. PM, SCADA, CD Registrar, java, C, C++, VB, EDI, ANSI X12, DNP3, Modbus and Mercator, SPARC H4, RMI, C and Apache Web Servers. US Workers only! Consulting positions requiring travel. Prevailing wage/benefits. Send resume to: HR, G.R. Patel & Associates, Inc. P.O. Box 1008, Waldorf MD 20604.

**Systems Analyst-Chamblee, GA:** Analyze, design, develop, test web, client server, mainframe & ERP Solutions with C, C++, Java, Oracle, VB, Win Runner, Load Runner, SQA Robot, Silk, Silk Performer and Dtest 3-on Unix/Windows. BS in Comp. Sc./Rel. field and 2 yrs. exp. in job offered. \$62,000/yr & benefits. Please respond to North Metro Job Order #GA 7082119, 2943 N Druid Hg Rd., Atlanta, GA 30329 or the nearest Department of Labor Field Service Office, EOE.

**Software Engineer** to analyze, design, develop, test and implement Intranet Billing System and mission critical development projects using C, Oracle, Visual Basic, SQL Server etc. maintain and support client/server, external intranet apps using Java, HTML, JavaScript, JSP and Java Servlets, perform requirements analysis, problem analysis, solution design, implementation and documentation on developed applications; perform debugging and modifications on existing software. Require: M.S. or foreign equiv in CS/Engineering (any branch) or related field with 1-year exp. in the job offered. Competitive salary. Travel required. Resumes to, Interall Inc, Attn: Bala - Director, 1718 Peachtree Street, NW, STE 554, Atlanta, GA 30309

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**IT Technical Analyst 2, Charlotte, NC.** First Union/Wachovia Corp. Divp. & maintain utility software to manage UNIX & eCommerce server Req. BA in Comp. Science or Info. Tech. & 1 yr exp. The 1 yr must have incl. work developing Internet appl. & interface dev. using Java in an Oracle Database & UNIX Envir. & work w/ TCP/IP networking, HTML, DHTML, CSS, Java Script, JSP, JSP Java Servlets, SQL, OAD, OOD and OOP 40hrs/wk, \$41,569. Send resume and cv. Mr. Airs Kee, 1525 West W. T. Harris Blvd., NC 0775, Charlotte, NC 28298-0775.

**Manager, Software Engng** wanted by legal info services co in NYC. Plan/manage the design & devlpmt of high-end web apps in client-server environment. Knowledge of OOAD, COM/COM+/DNA, MSCS, MSMQ, UML, Microsoft Net, SharePoint, SQL Server, Oracle, VB, ASP, software metrics. Resumes to CCH Legal Information Services, 111 8th Ave, NY, NY 10011.

**Programmer/Analyst (Alpharetta, GA):** Design & develop healthcare software applications using Rational Rose, RUP, Requisite Pro, Clear Quest, Clear Case, Oracle, WebSphere, IBM MQSeries, SQL, Cyber-La & (J2EE) APIs like JDBC, Servlets, JSP, RMI, EJB, Req. Bachelor or its foreign degree equivalent in C.S., Engineering, or its related field plus 2 yrs. exp. in job described. Resume to: HR Manager, job code GC0567, Software Services & Resources, Inc., 3574 Old Milton Pkwy, Alpharetta, GA 30005

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**Oracle Financials Programmer Analyst II (Kannapolis, NC):** Develop new codes and analyze and maintain existing custom codes for the Oracle ERP applications. Apply analytical and technical skills to define and resolve technical problems and issues. Write codes, test, implement, support and maintain applications. Maintain existing codes and functionality. Create and amend Oracle tables and create and change dependent triggers and store procedures. Provide technical support for projects. Assess requirements and translate them into codes. Provide technical expertise and consultation to users and other team members. Candidates must have a Bachelor's Degree or equivalent in Electronic Engineering, Computer Science, MIS, Engineering, or related field & 5 yrs of relevant progressive professional experience in the above stated areas. Please forward resume to: Mr. Don Mallo, VP Human Resources, Pilovox Corporation, One Lake Circle Dr. Kannapolis, NC 28081.

**Financial Systems Analyst:** A US residential & commercial roofing manufacturer is seeking a Financial Systems Analyst who will be responsible for administering & maintaining TM1 OLAP systems, developing web based financials/sales/mgmt management reporting & providing technical support to TM1 users. Req'd: Bachelor's degree in Finance, Business, CompSci or related w/2 yrs. exp in the job offered or as Business Operation Systems Analyst. Must have exp w/financial planning and/or reporting processes and/or systems. Must have exp w/OLAP technology, spreadsheet, RDBMS & web environments. Send res. to: Kathryn Schoenbachler, GF Materials Corp., 1361 Alps Rd., Wayne, NJ 07470.

**UNIX Internals Developer:** Mesh Networks, Inc. an Orlando based firm seeks a candidate to provide system software support in a Unix/Linux environment. Responsibilities include writing device drivers, daemons, and Unix system software to interface our wireless network to our wired network. BS in computer science or electrical engineering and 2 - 5 years experience with Unix internals (Linux preferred), embedded systems and protocol development required. Knowledge of Marant and Mobile IP is a plus. Experience developing for the SA1100 and the Ipat highly desired. Candidate must be able to work independently and anticipate requirements. Send resume with salary requirements to: Catherine Spencer, MeshNetworks, Inc., P.O. Box 948133, Mattland, Florida 32751.



## HCL

## HCL TECHNOLOGIES AMERICA INC.

HCL Technologies America, Inc. and its affiliate companies like HCL Enterprise Solutions have multiple openings at its offices in Sunnyvale, CA; Stamford CT; Plano TX; Florham NJ, Irvine CA, Vienna, VA, Boston, MA, Chicago, IL, Detroit, MI as well as project sites throughout the United States for the following positions:

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**Database Administrators**  
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**Management Analysts**  
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Salary will be commensurate with education and experience. All positions may involve travel or relocating to various client sites throughout the US.

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PROVIDER: Provide design, development, implementation & maintenance support for World-Wide-Web (WWW) database applications for biological & medical scientific research. Involves: WEB content development, database design & implementation & application interfacing with databases (ORACLE); work with Director & project scientists to create WWW applications to conduct data collection, validation & analysis to directly support & conduct the research project; development of projects in both UNIX (SUN Solaris) & PC (Win 95 & NT) systems. Uses Perl, Java, CGI & relational database design & implementation (ORACLE) to perform duties. Must have Masters degree in Mathematics, Computer Science or biological sciences, completed one course each in Programming Languages, Operating Systems, & Databases as part of overall degree work, & 3 months experience teaching or using mathematical modeling & computer programming. 40 hrs/wk. Multiple positions available. Reply to: Medical College of Wisconsin, Employment Office, 8701 Watertown Plank Rd, Milwaukee WI 53226.

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is a worldwide computer consulting firm providing IT Services for domestic and international clients. Currently, we are recruiting multiple positions nationwide. Oracle DBA: Performance Tuning, Disaster recovery, Training and mentoring; Process flows; Must have experience in upgrading the Oracle Application from 10.x to 11.x version with Siebel Interbatch - CrossWorks, Application Cloning, Security Management, Varitas Cluster Server, UTF8 character set conversion, experience with the following Oracle Application modules - Oracle CRM, HR, GL, AR/AP DBA Support on AIX, Oracle 7.3/9, Developer 2000. Oracle 7.x/8.x/9.x, Oracle Applications 10.x/11.x, CrossWorks, Forms 6.5/4.x, Reports 6.5/4.x, AIX 4.3.3/5i, HP-UX 10.x, Linux, Windows 98/NT/2000/XP Apache web servers, Parallel and replication servers, MCP and OCP certifications is a must. Salary from \$65,000.

Programmer Analysts: Client/Server - Visual, Borland C++, UNIX/C++ Development, Cobol, Pro/C, Oracle Developer, Architects with Web and/or Network Management System Engineer with Web experience. Salary from \$60,000.

ERP/BaSH/BaA/IV Business Objects Interfaces (BOI), XML, OEM, EDI, B2B, Bases, Procurement, Oracle, Triton Base, Sun Solars, NT, Salary from \$60,000.

Requirements: Bachelors degree with a minimum of 2 years exp. Some positions require a Masters degree with at least two years exp. Only those eligible for permanent positions need apply. Must be willing to travel and relocate, if necessary. Salary will depend upon experience. Please send your resume to PRG SYSTEMS INC. 42-C, Reads Way, New Castle, DE 19720, or by email at recruiter@prgsi.com.

Positions are available for a Vice President, Professional Services and a Consulting Manager with an Atlanta-based e-business technology company. The company provides solutions that enable corporations and software providers to leverage emerging technologies to more effectively compete in the global market. The Vice President is ultimately responsible for all global implementation projects and providing professional software expertise to the company's customers. Specific responsibilities include developing goals and strategies to ensure customers continue to receive on-going technical implementation expertise and support, developing strategies to expand the consulting practices, and profit, loss, and budgeting for professional services organizations.

The Consulting Manager is responsible for managing and implementing multiple global client projects, relationships, and initiatives including managing cross functional teams in evaluating and assessing scope, schedule, targets, priorities, risks and conflict negotiation to ensure successful implementation.

Candidates for the Vice President's position should possess a Masters degree in a Computer field and at least five years' management experience including two years' international IT project management experience with Oracle, AS400 (RISC) and mainframe, PL1, and JAVA. Candidates for the Consulting Manager's position should possess a Bachelor's degree in Business or Computer Science and at least five years' experience in Technical Consulting including at least two years' experience in technical training, third generation programming, project planning and management, and implementing technical solutions in middleware.

Apply by mail with resume to: Cindy Mayer  
 400 Perimeter Center Terrace  
 Suite 195  
 Atlanta, Georgia 30346

Staff Engineer (Essex Junction, Vermont). Verilog RTL modification, verification and implementation of Hard Disk Drive controller ASICs; logic design and verification; setup of simulation environment and platform for batch mode verification; hardware and design disk drive controllers for computer applications, utilizing Verilog Hardware description Language (HDL), Unix C-shell programming language and AWK. Requires a Bachelor's or foreign equivalent degree in Engineering, computer Science, or MEng and one year experience in the job offered or one year experience in the related occupation of Design Engineer/40 hrs/wk, 8:00 am - 5:00 pm, \$81,270/yr. SEND RESUMES TO: Job Order No. 613515, Jobs and Training Division, VT Department of Employment and Training, P.O. Box 468, Montpelier, VT 05601-0468.

Software Engineer. Duties: Plan, develop & implement the use of testing measurements for software releases using Java. Execute test case scenarios & test data for software fixes & enhancements using Java. Maintain test cases & expected results to be used for ongoing regression testing of system. Document test results & comment. w/developers on recommended enhancements. Requires: B.S. (or foreign eqv) in Comp. or Info. Sci., Eng. or related field & 2 yrs. exp. in the job offered or 2 yrs. exp. as a Prog/Analyst or Systems Analyst. Concurrent exp. must incl. 2 yrs. developing & implementing the use of testing measurements for software releases and 2 yrs. exp. using Java. EOE. 40 hrs/wk, 8:00 a.m. to 5:00 p.m. Send resume (no calls) to: Bonnie Lafave, CTH, Inc., 55 Public Sq., St. G., Cleveland, OH 44113.

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PeopleSoft Sr. Consultant. Job Location: Chicago, IL. Duties: Analyze, design, develop & implement software solutions for PeopleSoft Human Resources Mgmt. Systems (HRMS) using SQL, PeopleSoft & SQL. Perform apt design, set-up & testing using PeopleSoft & Oracle database. Perform Fit & Gap analysis of HRMS & 3 yrs. exp. performing BS. in Comp. Sci., Eng., HR Mgmt. or related field & 3 yrs. exp. in the job offered or 3 yrs. exp. as a Consultant or Software Eng. Will accept any comb. of relevant exp. equ. to B.S. degree. Concurrent exp. must incl. 3 yrs. exp. designing & implementing software solutions for PeopleSoft HRMS & 3 yrs. exp. performing fit & gap analysis. EOE. 40 hrs/wk, 8:00 a.m. to 5:00 p.m. Send resume (no calls) to: Diane Tuccito, AnswerThink, Inc., 817 W. Peachtree St., Suite 800, Atlanta, GA 30308.

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Responsible for leading and performing various research, design, coding and testing assignments in the development of computer systems and the analysis of human and hardware resources. Performs gene and sequence analysis process and performs software requirements from the scientific users to determine feasibility of design within time and cost constraints.

Must possess a Ph.D. in Computer Science or a related field and relevant experience with the genomics industry, including the gene and sequence analysis process and tools and their development; object-oriented programming in Java and Relational Database Management Systems in an Oracle Relational Database engine; mathematical concepts such as probability, statistical inference, algorithm proofs, fractions, percentages, ratios and proportions, statistics and probability theory and machine learning techniques.

Resume and/or cover letter must reflect each requirement above and specify reference code GLB or it will be rejected.

Forward resume to Jennifer Barretta, Human Resources Manager, Genaisance Pharmaceuticals, Inc. at 5 Science Park, New Haven, CT 06511 EOE.

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Positions are available for Systems Support Engineers and Product Consultants with an Atlanta-based e-business technology company. The company provides solutions that enable corporations and software providers to leverage emerging technologies to more effectively compete in the global market.

The Systems Support Engineers will be responsible for providing software expertise in developing and producing software systems for three-tier Middleware development and production packages that reside on UNIX and NT servers.

The Product Consultants will be responsible for planning, developing, and implementing custom middleware applications at customer sites using Java, Visual Basic and C++ to design, develop, implement and test software projects.

Candidates for the Systems Support Engineer positions should possess a Bachelor's degree in Computer Science or a related field and at least two years' experience in systems support for middleware technology using JAVA.

Candidates for the Product Consultant positions should possess a Bachelor's degree in Computer Science or a related field and at least two years' experience in software design and development implementing middleware technology or web enabling and database technologies including XHTML and XML or JAVA, and demonstrated knowledge of AS 400 technology. Ability to travel 100% of time.

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COLGATE-PALMOLIVE CO.	10	DIAMERCO SYSTEMS INC.	1	NETSCAPE INC.	44	SUN MICROSYSTEMS	1,16,20,25,28,35,52		

# Bulgaria: The Next Offshore Frontier

Low rates, advanced skill sets, language compatibilities of programmers lauded

BY THOMAS HOFFMAN

THEY'RE FAST, they're cheap and they're highly skilled.

They are Bulgarian programmers, who, according to their customers, deliver on Web development efforts from overseas in a fraction of the time it would have taken their American counterparts — and at a substantial discount.

On top of that, customers say the Bulgarian programming teams they have dealt with through their contracts with Philadelphia-based iConcepts Inc. typically respond to glitches overnight and speak fluent English.

Hi-Tech Parts LLC, a Plymouth, Mass.-based firm that provides an online database for buyers and sellers of computer components, evaluated four consulting firms — two in the U.S. and two in Canada — before settling on iConcepts in January to rebuild its site.

## Fast Service

Of the four companies that bid on the search-and-retrieval project, iConcepts "was the only one that could rebuild my site in three months. Everyone else said six months or more and at a much higher cost," said Kristal Snider, Hi-Tech's president.

The Bulgarian programming team was able to get Hi-Tech's site rebuilt and running by March. Though Snider wouldn't disclose how much Hi-Tech paid iConcepts to rebuild its site, she did say, "I would have paid six figures had I not

brought them in."

Said Snider, "You could put together a team of [Bulgarian] programmers there for what you might pay for one or two [programmers in the U.S.]."

Though IT managers should consider a variety of factors beyond cost in assessing offshore programming contracts [QuickLink: 29877], the one-two punch of the Sept. 11 at-

tacks and the downturn in IT spending have forced offshore programming costs downward this year.

At programming houses in India, where 80% to 90% of offshore development deals are handled, the "blended rates" for teams of programmers, managers and software testers have dropped from \$30 an hour in 2001 to about \$20 to \$25 an hour this year, said Marty McCaffrey, executive director at Global Outsourcing, a Salinas, Calif.-based research and consulting firm that specializes

in offshore outsourcing.

But as the economy improves, companies that have been stalling software development and integration projects will pump up demand — and labor rates — for offshore programming firms in India, Israel, the Philippines and other markets, said McCaffrey.

Other companies have also had success taking their online search-and-retrieval projects to iConcepts and its Bulgarian counterparts. For instance, Dionex Corp., a Sunnyvale, Calif.-based manufacturer of chromatography instrumentation, needed a stand-alone engine for its sales staff and customers to search its documentation and product data. For an initial \$11,000 fee, iConcepts and its Bulgarian programming team were able to develop a CD-ROM for Dionex and its cus-

## Programmable Pay

The average first-year salaries for highly trained software professionals:

India	\$5,000 - \$8,000
China	\$6,000 - \$8,000
Russia	\$5,000 - \$8,000
Pakistan	\$3,600 - \$6,120
Philippines	\$8,000 - \$10,000
Bulgaria	\$3,600 - \$6,000

SOURCES: NATIONAL ASSOCIATION OF SOFTWARE AND SERVICES COMPANIES, SOFTWARE ASSOCIATION OF PAKISTAN, CEBISNET MARKET RESEARCH, META GROUP INC. AND WWW.METRICNET.COM

tomers, helping to slash the company's document management costs by \$23,000 per year.

As a result, the initial investment "paid for itself twice over in the first year," said Doug Jamieson, Dionex's director of consumables manufacturing. ▀

Continued from page 1

## GM LANs

send and receive information to and from workers and systems in the manufacturing environment. "It provides you with agility and flexibility that did not exist before," Graham said. GM plans to standardize on Wi-Fi, or 802.11b, wireless LAN technology in all of its plants, he added.

The rugged enclosures for the access points and the tuned, directional antennas required to propagate a signal inside a plant without having it spill outside cost \$1,000 each.

But Graham said GM expects a quick payback on its investment — less than one year. He declined to elaborate further on the financial details.

Jack Maynard, an analyst at Boston-based Aberdeen Group Inc., said the fact that GM expects to recoup its investment so quickly indicates that the company had "a real problem" with locating parts expeditiously and efficiently.

## JUST THE FACTS GM LANscape

GM's wireless LAN infrastructure will cover 25 manufacturing plants; 35 to 65 access points will cover an 80-acre plant.

**HARDWARE:** Access points from Cisco Systems Inc.; rugged devices running Microsoft OS supplied by Symbol Technologies and Intermec Technologies Corp.

**INITIAL APPLICATIONS:** Materials management

**FUTURE APPLICATIONS:** Real-time location system; access to "virtual factory" database and CAD drawings

**PAYBACK/ROI:** Less than one year

**SECURITY:** 128-bit Wired Equivalent Privacy; subnetted VPNs; tuned, directional antennas

**MIGRATION PATH:** Designed for upgrade to 54M bit/sec. 802.11a or 802.11g

Maynard added that GM could use the wireless LAN-based materials management system to drastically change its manufacturing operation to a build-to-order model.

GM has already equipped 75 to 100 forklift trucks with wireless terminals in each plant. In

its New United Motor Manufacturing Inc. plant in Fremont, Calif., which it operates jointly with Japan-based Toyota Motor Corp., GM has installed a wireless location system from WhereNet Corp. in Santa Clara, Calif., that works with the wireless LAN.

When workers need to replenish parts for their station, they press a button on a wireless pendant at their workstation. The request is displayed on a screen on the forklift, showing the location of the worker and the materials required. Triplett said he views vehicle-tracking information as another high-priority application for the wireless system.

Ford Motor Co. and DaimlerChrysler AG both operate extensive wireless LAN networks at their North American manufacturing plants, but neither currently has plans to install an infrastructure equal in scope to GM's.

Jim Buczkowski, director of manufacturing and supply chain IT at Ford, said the company has installed wireless LANs at all 21 of its North

American assembly plants, but with zoned coverage rather than plantwide coverage.

Ford uses wireless LANs in the yards of all its plants to control and manage finished-vehicle inventory and has experimented with installing wireless terminals on forklifts, Buczkowski said. But Ford hasn't been able to justify a business case for wide-scale rollout of wireless terminals on forklifts, he said.

Elvie Likine, manager of wireless communications at DaimlerChrysler, said the company has older wireless LANs that operate in the 902-MHz band that are used to support yard operations. The automaker has also installed 802.11b wireless LANs, which operate in the 2.4-GHz band, at some of its plants to support specific applications such as "end of line" testing of electrical components.

DaimlerChrysler plans to stick with the 902-MHz wireless LANs for now because "we do not see a business case to shift from 902 MHz to 2.4 GHz," Likine said. ▀

FRANK HAYES/FRANKLY SPEAKING

# The Value of Plan B

**R**EALNAMES CORP. is going out of business. That's the company behind the technology that lets you type a keyword into Microsoft's Internet Explorer to go to a Web site, instead of having to use a complete Web address. RealNames went down because its technology wasn't successful enough to keep Microsoft, its most crucial partner, interested. When Microsoft decided not to renew its two-year deal with RealNames past June 30, RealNames closed its doors.

Yes, there's more to the story than that. RealNames also owed

Microsoft \$25 million and had twice missed deadlines for paying it. RealNames' now-ex-CEO Keith Teare is convinced Microsoft just couldn't accept not being in control of the RealNames piece of the infrastructure. Microsoft says that the RealNames keyword approach just wasn't useful to users and that future versions of Internet Explorer will have some kind of natural-language search function.

What really happened? Judge for yourself: Teare's personal Web log ([www.teare.com](http://www.teare.com)) includes more details, including notes from the May 7 meeting in which Microsoft managers repeatedly explain to Teare that the deal is dead, and Teare keeps looking for ways to resuscitate the corpse.

So why does another dying dot-com matter? Because RealNames isn't the only Internet business that's been on life support since the big dot-com die-off.

Some companies, like RealNames, kept going because they had deals with big customers. Others were bought up by conventional companies that haven't yet managed to absorb them. Still others have just been hanging on by their fingernails, hoping business will improve as the economy gets better.

But as the slump drags on, we're going to see another slow wave of dot-com failures as deals expire, buyers cut their losses and finger-nail-hangers run out of faith, hope and money.

And if you depend on a doomed dot-com for any kind of service or technology, you'll be in trouble.

Face it, we're all hunkered down right now — we're not really ready for any sudden disruptions. But if a service provider shuts down, we'll have only weeks, or even just days or hours, to get things back on track.



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Consider Asian users of RealNames. For English-language Web sites, RealNames keywords were really just a convenience. But for sites using languages like Chinese or Japanese, RealNames made it possible for users to type in a business name in their native language — much more meaningful than a Web address in English.

Now those businesses are scrambling to warn their users that the familiar keywords won't work after June 30. And in one sense, they're lucky — they still have more than a month before RealNames is completely gone.

What happens if your credit card verification service goes toes-up? Or your search-engine service, or an e-commerce service provider, or some other technology your customers or users need or have simply grown accustomed to? You won't have a month — you'll need a replacement *now*.

So don't wait. Make a list of those outside service suppliers now. (And remember the lessons from your Y2k inventory: You don't know all the places where you're using those services until you look — and you don't know whose services they depend on until you ask them.)

Then rank those suppliers by risk and importance to your customers and your IT processes. Investigate alternatives. Figure out what it will cost — in time, reconfiguration effort and lost business — to make a switch if you need to. And, finally, draw up your contingency plans.

Yes, that will cost time and effort you didn't plan to spend in these tight times. But if that contingency plan cuts your recovery time in half, it'll be worth it.

And if service providers go out of business, you don't want them taking you with them — even for a little while. ▀

## SHARK TANK

**OVEREAGER** new manager promises his boss a 30-day schedule for a project to automate passwords on company's mainframe, midrange and desktop systems. We can't do that, desktop support pilot fish tells manager when he sees the project plan. "Have you confirmed that the mainframe and mid-range support groups can do the product evaluation in the three days you've allotted?" fish asks. "No," says manager, "but if they don't meet the plan, then it'll be their fault it fails, not mine."

doesn't want IT workers showing up in nice limos."

**MAIL SYSTEM** at this manufacturing plant goes down, so IT pilot fish calls vendor's support line. While fish is talking to support, vendor also sends out a local tech — who peers over fish's shoulder and says, "Man, you're way past anything I can help you in." Phone support guy overhears this comment and tells fish, "Yeah, we don't tell those technical support specialists much because we're afraid that they'll change something."

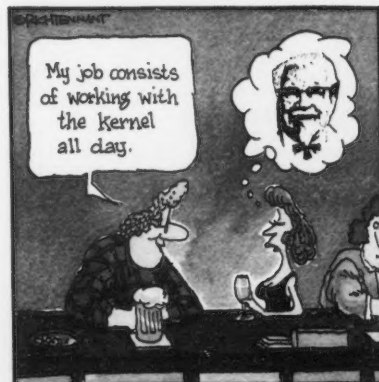
**SYSTEMS** administrator is describing problems he has hit while replacing a file server's failing hard drive. Senior sysadmin pilot fish interrupts to ask if he did a backup before starting. "No," says sysadmin. But why not? asks perplexed fish. "Well, the new drive I was installing might not have worked," says sysadmin. "What's the point of having a backup if you don't have a drive to put it on?"

**EACH TIME** IT pilot fish goes to this remote site, it's a \$150 cab ride. So fish finds a limo service that'll make the trip for \$80 and suggests it to his boss, who sends the proposal upstream. A week later, boss passes along the verdict: "Upper management

"**MY SCREEN** is black," user tells help desk pilot fish. "I think I need to replace a fuse." What's on the screen? fish asks. "It's telling me to replace the disk." Do you have a disk in the floppy drive? fish asks. "Omigod, yes!" user says. Remove it, then reboot, fish directs. "Omigod!" repeats user as the PC boots successfully. "No wonder they pay you guys so much!"

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- 11 That we built Together.



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